DEVELOPMENT OF MACHINERY IN U.S. NAVY. See p. 33.
EXCESS PROFITS AND SHIPPING. See p. 31.

Physic
Applied
Serials

SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

LONDON: Queen Anne's Chambers, S.W. 1.
GLASGOW: 87, Union Street.
NEWCASTLE: Lloyds Bank Chambers.

THURSDAY, JULY 12, 1917.

Price Sixpence Weekly;
Prepaid Subscription for 12 months:—
Inland, £1 5s. 0d.; Abroad, £1 12s. 0d.

The DELTA METAL Co., Ltd., East Greenwich, London, S.E.
Sole Manufacturers of:—
DELTA METALS: BRONZE, BRASS, COPPER, NAVAL BRASS, YELLOW METAL, WHITE BRASS, BABBITS, Etc.
Forgings, Castings, Stampings, Rods, Sheets, Wire, Tubes, Etc.
FOREMOST since 1883.

THE YORKSHIRE COPPER WORKS, LTD., LEEDS. TUBES BRASS and COPPER.
"BEMAL" BRASS CONDENSER TUBES.

THE "STONE" SYSTEM of HYDRAULICALLY OPERATED WATERTIGHT DOORS. AS FITTED TO LATEST MAIL AND PASSENGER STEAMERS. J. Stone & Co., Ltd. Deptford, LONDON, S.E.

ROBT BOWRAN & Co., LTD., Newcastle-upon-Tyne. MARINE METALS "WHITE" BRONZE, "MARINE" BRONZE.

EXTRUDED METALS
Brass and Bronze Rods for Turning, Forging and Stamping.
GUNMETAL INGOTS.
McKECHNIE BROTHERS, LTD.,
Brass Rod Manufacturers,
ROTTON PARK STREET, BIRMINGHAM.

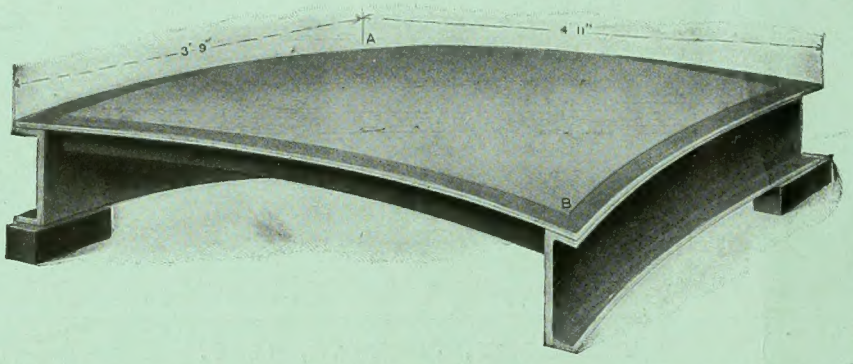
JOHN I. THORNYCROFT & Co., Limited.
SHIPBUILDERS & ENGINEERS
MARINE MOTORS & MOTOR BOATS.
CAXTON HOUSE: WESTMINSTER: LONDON, S.W.
ALL TYPES OF STEAM, COMMERCIAL and PLEASURE CRAFT.

THE SUNDERLAND FORGE & ENGINEERING Co., LTD.,
SUNDERLAND.
ELECTRIC LIGHT & POWER FOR SHIPS. - - ELECTRIC WINCHES.

ELECTRICAL INSTALLATIONS ON STEAMSHIPS. - - - -
W. C. MARTIN & CO.,
10, West Campbell Street, Glasgow.
Telegrams: "MOTIVE," Glasgow.
Contractors for Cunard R.M.S. "AQUITANIA."

BILLINGTON & NEWTON LTD
TRADE MARK
PHOSPHOR BRONZE.
BABBITT'S, KINGSTON'S AND MAGNOLIA
MANGANESE BRONZE
TRADE MARK
TIN AND COPPER
NAMO. PLASTIC
ANTIFRICTION METALS
LONGPORT STAFFORDSHIRE

DOCKERS' INDUROLEUM
FIREPROOF FLOORING *for*
SHIPS, SHIPS' SALOONS, &c., &c.



This Sketch shows an actual test of "INDUROLEUM" Flooring. The "Induroleum" was laid ½ in. thick on ¼ in. Steel Plate and supported at cross corners, the opposite corners A B were then pressed down by hydraulic pressure to the extent of 3 in., and released without any sign whatever of cracking the "Induroleum."

INDUROLEUM is the finest flooring composition obtainable.
It is FIREPROOF, ELASTIC, JOINTLESS, ANTISEPTIC.
It is easily applied and sets with an even surface. *Supplied in all Colours.*

DOCKER BROTHERS, LTD., *Head Offices:* SALTLEY, BIRMINGHAM.

Telegrams: JAPAN, Birmingham. Telephone: 6410 Central (six lines).

THE POWER PLANT CO LD
WEST DRAYTON MIDDLESEX.

SINGLE AND DOUBLE REDUCTION GEARS FOR TURBINE SHIP DRIVES

for any power.

MICHELL THRUST BEARINGS.

TURBO BOILER FEED PUMPS.

Telegrams: "ROC, WEST DRAYTON." Telephone: 22 YIEWSLEY.

Manufactured by Welded and Weldless Processes

WROUGHT IRON AND STEEL

BOILER TUBES

For Marine, Locomotive & Stationary Boilers

Main Steam Pipe Installations

Bilge Suction & Oil Cargo Pipes, Dredger, Suction and Delivery Mains,
Tubular Steel Derricks, Davits, Masts, Posts, Pillars & Hand Rails.

STEWARTS AND LLOYDS, LTD.

41, OSWALD STREET, GLASGOW · BROAD ST. CHAMBERS, BIRMINGHAM · WINCHESTER HOUSE, OLD BROAD ST, LONDON.

ALL STEEL STORAGE BINS

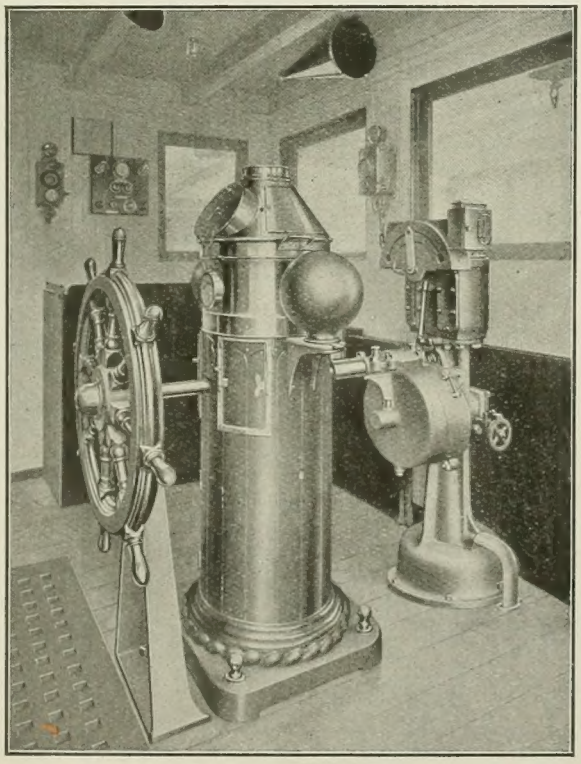
are ideal for all kinds of Engineers' stores, and can be broken down for shipment and easily erected. They are exceptionally strong, clean, take up less room, and can be made with various sized compartments . . .

Crittall

BRAINTREE, ENGLAND.

The one illustrated has the advantage that the lower portion can be used as a counter. They are fireproof and practically everlasting.

CRITTALL STEEL FURNITURE CO., LIMITED,
BRAINTREE, ESSEX, ENGLAND.
London Office - - - 11 & 12, Finsbury Square, E.C. 2.



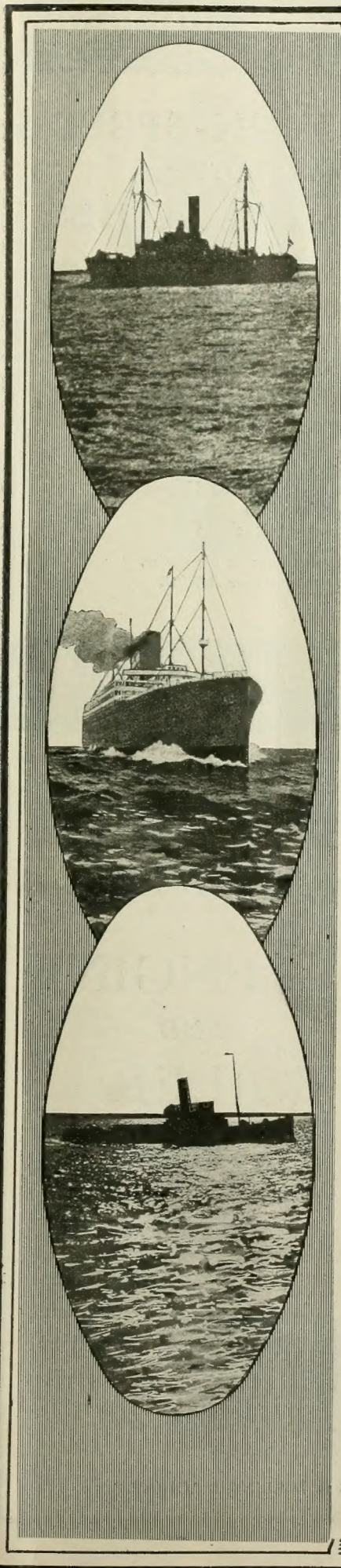
STEERING TELEMOTORS

UNIVERSALLY ADOPTED BY THE LEADING SHIPPING COMPANIES.

Mactaggart, Scott & Co.
LTD.,
LOANHEAD, EDINBURGH.

Telegrams: "Valve, Loanhead." :: Telephone No. 12.

CONTRACTORS TO BRITISH AND FOREIGN ADMIRALTIES.



The Factor Productive

of Zinc Economy

is

Atlas "E" Boiler Preservative.

AS SHOWN BY THE FOLLOWING COMPARISON

Taking as an example a vessel with two boilers of 30 tons water capacity each, over a voyage of, say, three months, the cost of the Zinc and Soda would work out as follows:—

	£	s.	d.
Two boilers—6 furnaces. Say 4 Zinc plates on each furnace and 2 in each water space = 40 plates, each plate weighs approx. 10 lbs., 10 × 40 = 400 lbs., or say 3½ cwt. at 65*s.* per cwt.	11	7	6
1 lb. of Soda per 1,000 galls. for, say, 23 steaming days per month = 13 lbs. per day, or say 8 cwt. at 4*s.* for three months' steaming	1	12	0
Total for Zinc and Soda ...	£12	19	6

The following are the figures for Atlas treatment:—

Two 30-ton boilers—water capacity, 6,700 galls. each.

On filling—2 quarts of Atlas "E" per 1,000 galls.

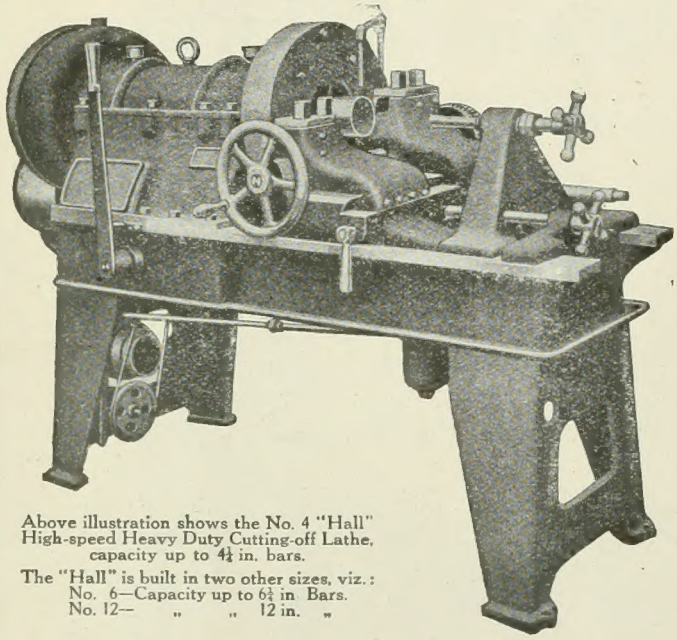
Under steam—1 pint of Atlas "E" per 1,000 galls. per week for, say, 10 weeks' steaming.

Cost—	£	s.	d.
Atlas "E"	6	12	6
Zinc Plates, 2 on each furnace = 12 at 65*s.* per cwt.	3	10	0
Total for Atlas treatment ...	£10	2	6

These figures are compiled from a specific enquiry; and though the price taken for Zinc plates is lower than obtains at present, even under these conditions the saving by adopting Atlas treatment for Marine boilers is obvious. *Write us now* for particulars of how you can reduce your boiler upkeep costs.

Atlas Preservative Co., Ltd.,
DEPTFORD, LONDON, S.E.

Railway Shop, Shipyard, Arsenal & Rolling Mill Plant
Hydraulic, Pneumatic and Electric Tools.



Above illustration shows the No. 4 "Hall" High-speed Heavy Duty Cutting-off Lathe, capacity up to 4¼ in. bars.

The "Hall" is built in two other sizes, viz.:
No. 6—Capacity up to 6¾ in Bars.
No. 12— " " 12 in. "

"HALL" HIGH-SPEED
HEAVY DUTY
CUTTING-OFF LATHES

15 "HALL" LATHES FOR IMMEDIATE DELIVERY FROM OUR LONDON STOCK

Also the following, viz.:—

4—4 in. "Acme" Cutting-off Machines
3—4½ in. "Williams" Cutting-off Machines
6—"Little Giant" Vertical Milling and Slotting Machine
20—14 in. "Washburn" Sensitive Drilling Machines
7— do. High-speed do.
74—"Columbia" Sensitive Drills
2—No. 4a High-speed Shell Riveting Hammers
143—Bench Drills of various types
3—"Reynolds" Screwdriving Machines

Prices and Particulars on application.
Foreign Correspondence Solicited.

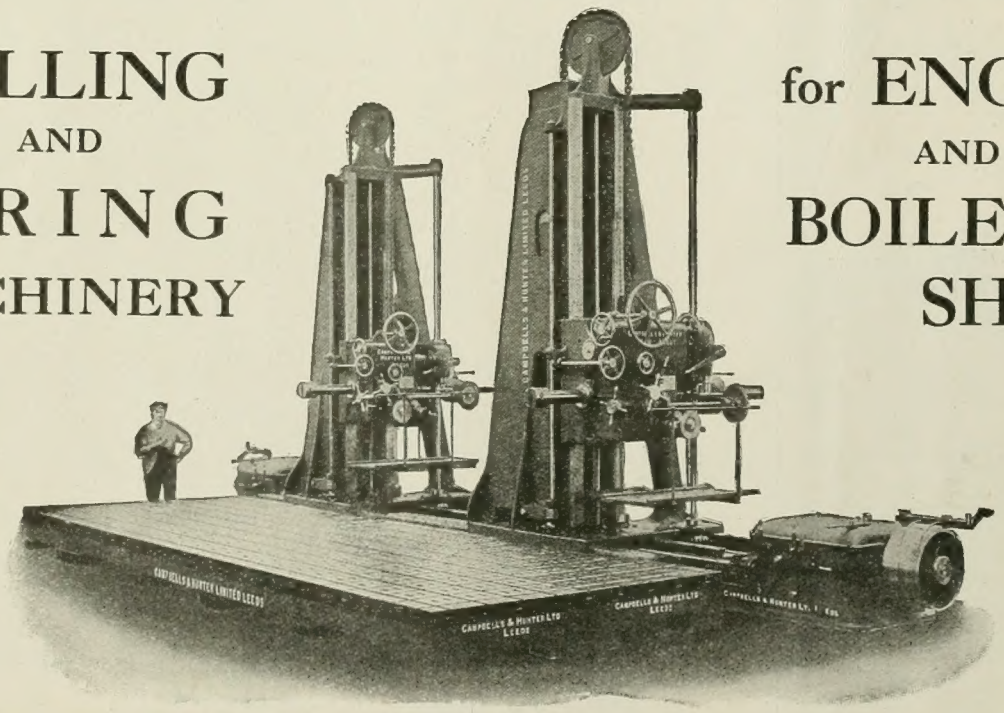
Universal Machinery Corpn Ltd, 326 Old Street, London E.C.2
Machine Shop and Foundry Equipment of every description.

CAMPBELLS & HUNTER, Limited,
Dolphin Foundry, LEEDS.

TELEGRAMS: DOLPHIN, LEEDS.
TELEPHONE: 768 LEEDS.

DRILLING AND BORING MACHINERY

for ENGINE AND BOILER SHOPS.

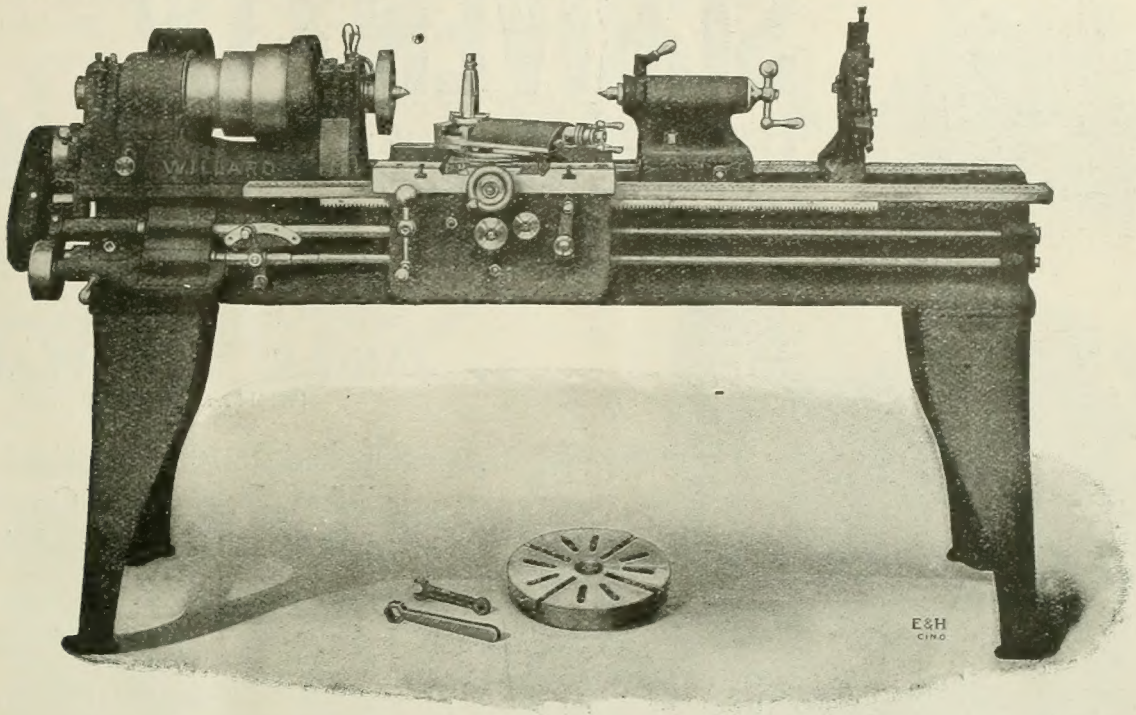


Of all Types and up to the Largest Sizes.

Your enquiries will be esteemed.

HORIZONTAL DRILLING, TAPPING, STUDDING, BORING, FACING & MILLING MACHINE.

MACHINE TOOLS in STOCK or for EARLY DELIVERY.



HORIZONTAL MILLS—

No. OH Le Blond, cone pulley, back geared, auto. long. feed,	18″ × 6″ × 15″	10 wks.
No. 25 Standard, cone pulley, friction double geared, auto. long. feed	34″ × 8″ × 18″	4 wks.
No 1 U.S. hand mill, cone pulley	16″ × 7″ × 16″	Stock
No. O Bristol, hand, vert. mill. attach.	14″ × 6″ × 18″	Stock
No. 1 Carter Hakes, bench hand, cone pulley	4″ × 2¾″ × 4″	Stock

MILLING MACHINE ATTACHMENTS—

10″ Simmonds Univ. dividing heads	3 wks.
Le Blond Vert. Index heads	6 wks.
16″ Le Blond Plain Gear cutting heads	Stock
Le Blond Vert. spindle mill. attach.	4 wks.
17″ Le Blond circular table, hand feed	4 wks.

CAPSTAN LATHES—

⅝″ Southworth, ungeared, auto. chuck, wire feed	8 wks.
¾″ Woods, ungeared, auto. chuck, wire feed	3 wks.
1″ × 5″ Millholland, ungeared, auto. chuck, wire feed	Stock
1″ × 5″ Southworth, ungeared, auto. chuck, wire feed	6 wks.

ENGINE LATHES—

5½″ × 5′–0″ New England	1 wk.
6″ × 6′–0″ Reed, cone pulley, taper attach.	Stock
6″ × 6′–0″ Reed Prentice, all geared	Stock
6½″ × 6′–0″ Willard, double back geared	3 wks.
7″ × 6′–0″ Walcott, 3 step, quick change feed	6 wks.
7″ × 6′–0″ Reed Prentice, all geared	Stock
7″ × 6′–0″ Lodge and Shipley, select. head	6 wks.
7″ × 6′–0″ Lodge and Shipley, select. head, metric	6 wks.
8″ × 8′–0″ Fay and Egan, 3 step, double back geared	Stock
9″ × 9′–0″ Bell, 3 step, double back geared	Stock
9″ × 9′–0″ Chard, 3 step, cone pulley	4 wks.
10″ × 10′–0″ Lodge and Shipley, 3 step, double back geared	Stock
10″ × 10′–0″ Springfield, 3 step, double back geared	3 wks.
11″ × 10′–0″ Putnam, 3 step, double back geared	Stock
12″ × 12′–0″ Boye and Emmes, 3 step, quick change feed	Stock
15″ × 14′–0″ Springfield, 3 step, double back geared	Stock
18″ × 23′–0″ Putnam, all geared	1 wk.

TOOL ROOM LATHES—

6″ × 5′–0″ Davis, with taper attach.	6 wks.
9″ × 8′–0″ Lodge and Shipley, 3 step, taper attach.	4 wks.
9″ × 8′–0″ Lodge and Shipley, 3 step, taper and backing-off attach. to	4 wks.
9″ × 10′–0″ Lodge and Shipley, 5 step, taper and backing-off attach. to	4 wks

GAP BED LATHES—

6½″ × 6′–0″ Willard, double back geared	3 wks.
9″–18″–10′–0″ Putnam	Stock
11″–23″ × 12′–0″ Putnam	1 wk.

SENSITIVE DRILLS—

No. 1. 13″ Fixed head	Stock
Leland Gifford, ball bearing, bench, ⅜″ capacity	Stock
Leland Gifford, ball bearing, column, ⅜″ capacity	Stock

UPRIGHT DRILLS—

20″ Sibley, fixed head, double geared, auto. feed	8 wks.
20″ Sibley, fixed head, double geared, auto. feed, tapping	8 wks.
23″ Snyder, fixed head, auto. feed	Stock
24″ Sibley, sliding head, auto. feed, tapping	Stock
25″ Snyder, sliding head, tapping	Stock
28″ Snyder, auto. feed, comp. table	3 wks.
30″ Reed Prentice, sliding head, auto. feed	3 wks.
36″ Reed Prentice, sliding head, auto. feed	Stock

TOOL GRINDERS—

No. 1 Lumsden, for tools with shanks up to	1⅝″ × 2″ — 1 wk.
No. 2 „ „ „	2″ × 3″ — 1 wk.
No. 2a „ „ „	3″ × 6″ — 1 wk.
7″ Globe Tool Grinders	12 wks.
No. 1 Lumsden Plain Cup Wheel Grinder,	12″ diam. wheel — 1 wk.
No. 2 „ „ „	16″ diam. wheel — 1 wk.
22″ Lumsden Periphery Grinder	Stock
12″ × 1½″ Norton Bench Tool Grinder	Stock

FLOOR GRINDERS—

6″ × 1″ Norton bench, hood and C/S	Stock
8″ × 1″ Norton bench, hood and C/S	Stock
12″ × 2″ Norton bench, hood and C/S	Stock
14″ × 2½″ Norton column, hood and C/S	Stock
20″ × 3½″ Norton column, hood and C/S	Stock

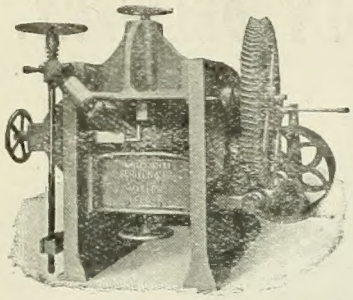
HACK SAWS—

6″ Racine Pump	3 wks.
6″ Racine, three speed, Pump	3 wks.
8″ Racine, three speed	3 wks.
12″ Racine, three speed	3 wks.

MANDREL PRESSES—

No. 00 Eames bench,	takes 7″ × 4½″	Stock
No. 1 Eames bench,	takes 14″ × 11″	Stock
No. 2 Eames bench,	takes 15½″ × 14″	Stock
No. 3 Eames stand,	takes 20½″ × 18″	Stock
No. 5 Eames stand,	takes 25″ × 46″	Stock
No. 6 Eames stand.	takes 37″ × 48″	Stock

ALFRED HERBERT LTD. COVENTRY.



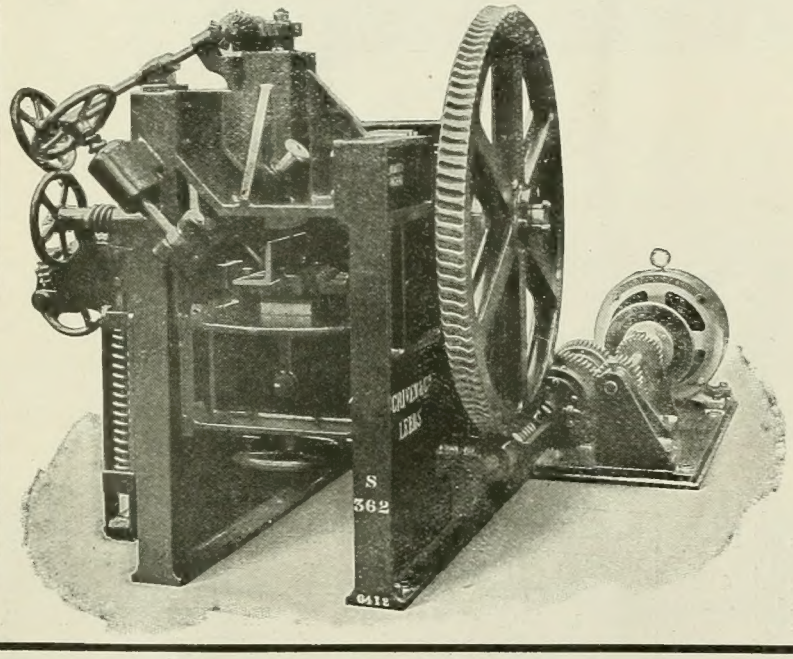
SCRIVEN & Co

TEL. ADD.: SCRIVEN, LEEDS.
'PHONE: 1819.

LEEDS OLD FOUNDRY,
MARSH LANE LEEDS.

MACHINE TOOLS

GENERAL & SPECIAL.



Original Makers of
ANGLE BAR PLANERS
(WHITE'S PATENT, 1886),

Supplied to the principal Shipbuilding Yards and Government Dockyards at Home and Abroad.

Over a Generation of Experience and Improvements at your disposal.

TOOLS FOR SHIPBUILDERS, CONSTRUCTIONAL ENGINEERS, STEEL WORKS, Etc.

BULLDOZERS.

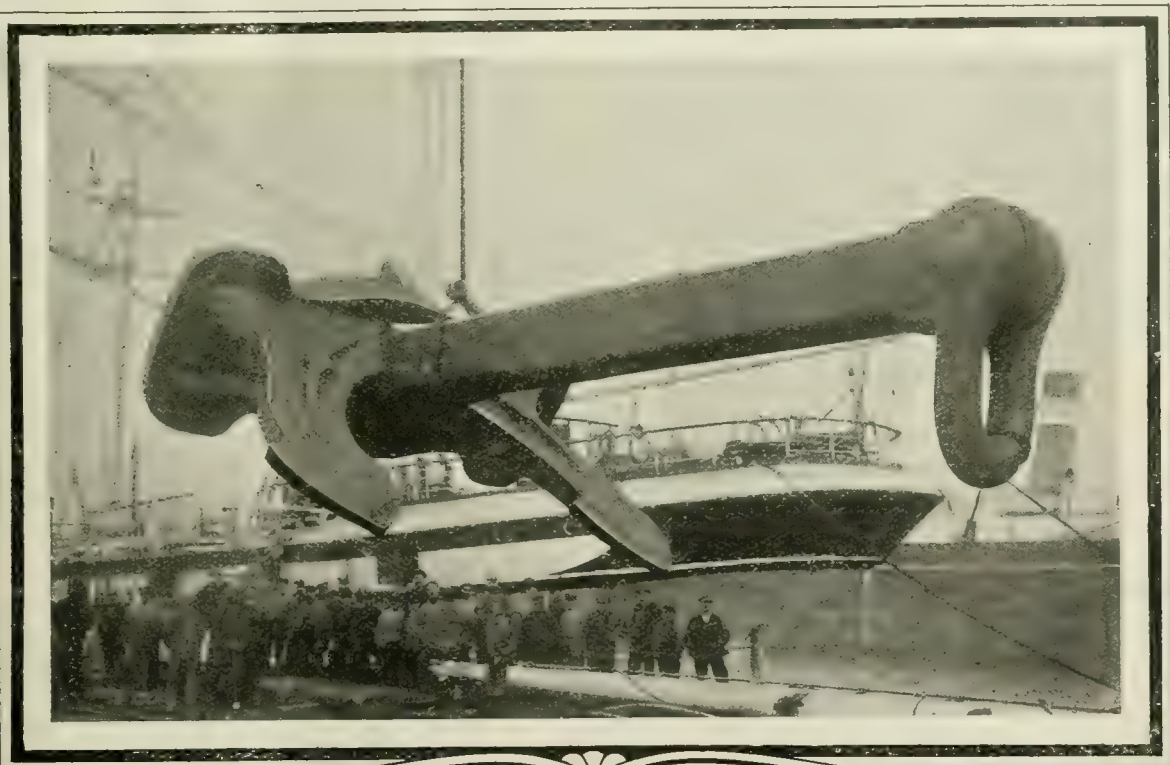
TAPS
for
BRITISH SHELLS

Having standardized various patterns for this work, we are in a position to offer prompt deliveries of taps for

3·3, 4·5, & 6 in. H.E. SHELLS,
No. 1 GAINE,
No. 100 GRAZE FUZE.

THOS. CHATWIN, Ltd.,
GREAT TINDAL ST., BIRMINGHAM.

N. HINGLEY & SONS
LIMITED
DUDLEY, ENGLAND.



ANCHORS

HALL'S LATEST IMPROVED AND
ALL STOCKLESS AND OTHER TYPES

NETHERTON **CABLES**

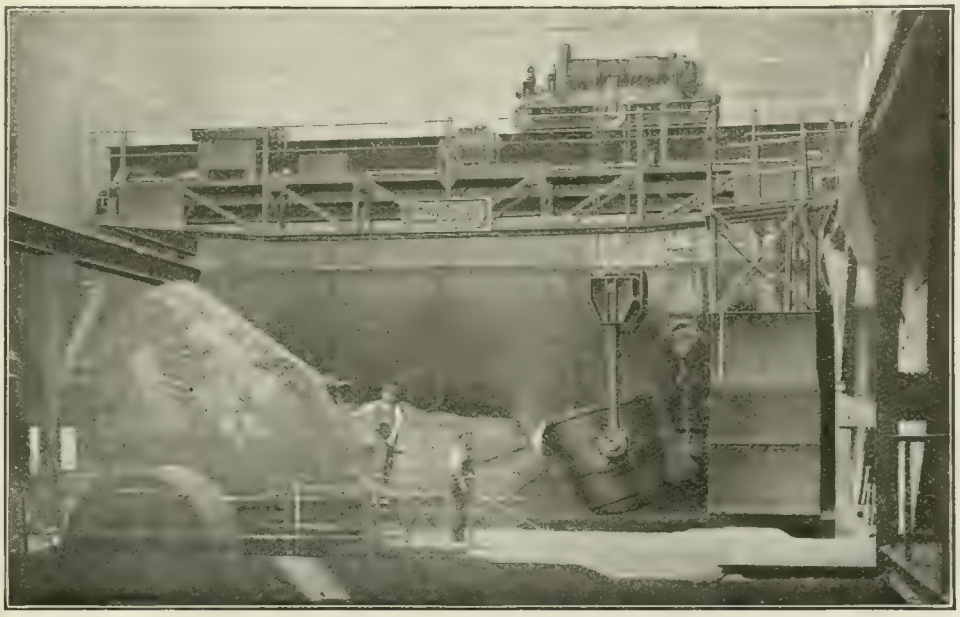
SAY YOU SAW IT IN THE "S. & S. R."

THOS. BROADBENT & SONS, LTD.

Telegrams: Broadbent, Huddersfield.

Central Iron Works, HUDDERSFIELD.

Telephone: 1581 (4 lines).



LADLE CRANE OVER CONVERTER.

ELECTRICALLY OPERATED

STEEL WORKS PLANT

CHARGERS, STRIPPERS, FORGE CRANES,

ETC.

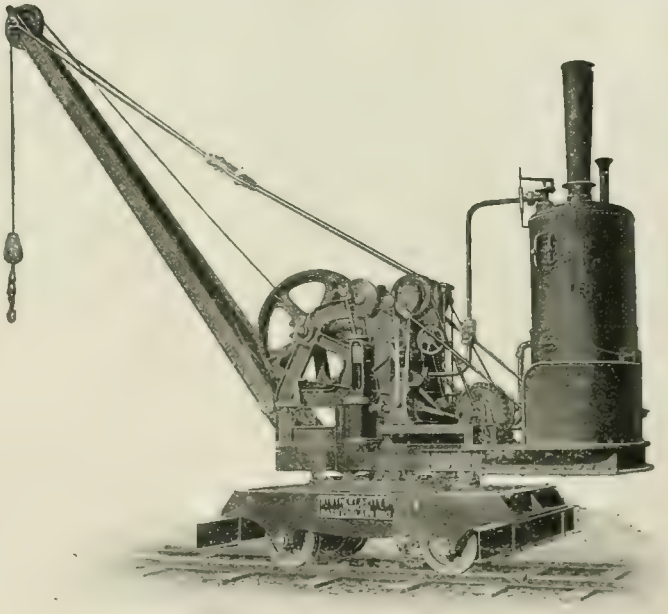
London Office: SUFFOLK HOUSE, LAURENCE POUNTNEY HILL, E.C.

BREAKDOWN CRANES

CAPSTANS

TRAVERSERS

CONCRETE MIXERS



WATER CRANES

ELECTRIC, STEAM AND HAND CRANES.

FIG. No. 1070.

STOTHERT & PITT, LTD., BATH.

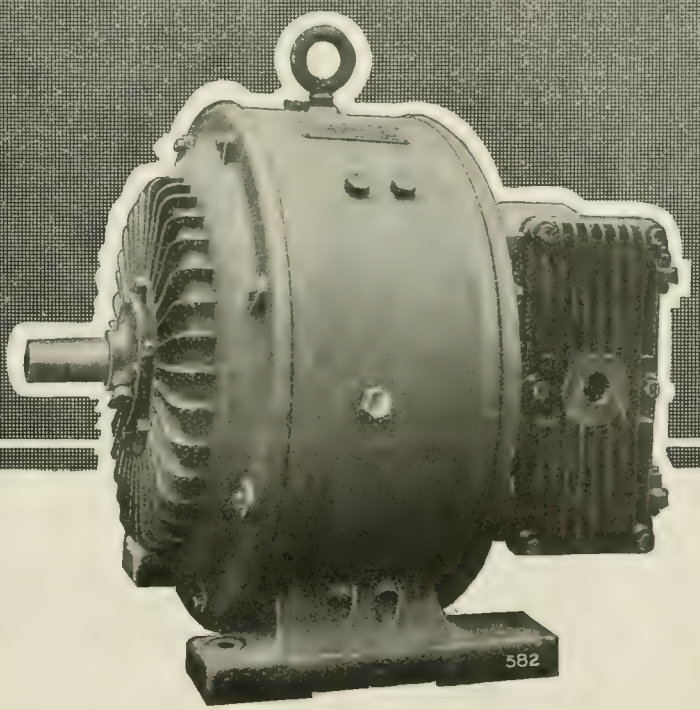
LONDON OFFICE:
38, VICTORIA STREET, S.W.

Representatives:—Messrs. Richardson, McCabe & Co., Wellington, N.Z. M. C. Coates, Melbourne.

Weather-Proof Motors

For driving winches, windlasses, etc.

QUALITY FIRST
ASK PHŒNIX TO QUOTE



Note the worthy features of the Phœnix Weather-Proof Motor which is designed and constructed for working in positions fully exposed to the weather, for example, ship decks, docks, and on all classes of ship loading and unloading appliances. All covers and end shields have exceptionally long machined surfaces specially protected against corrosion. LARGE inspection doors are provided to give ample access to the interior; these doors are fitted with non-Corrodible fastenings. Windings are mica insulated where possible and impregnated under pressure and vacuum. BRUSHGEAR made to withstand vibration.

ALSO MANUFACTURERS OF
SHIP LIGHTING DYNAMOS

Phœnix
BRADFORD

Phœnix Dynamo Manf. Co. Ltd. Bradford. 'Phone (Private Branch Exchange) **3700** (8 lines). Cables and Telegrams: "Dynamo, Bradford."

Branches at LONDON, GLASGOW, BIRMINGHAM, SWANSEA, NEWCASTLE-ON-TYNE, and Abroad.

SELF-LUBRICATING

STEAM ENGINES FOR USE ON SHIP-BOARD

Also STEAM TURBINES and AIR COMPRESSORS.

ADVANTAGES:

DURABILITY.

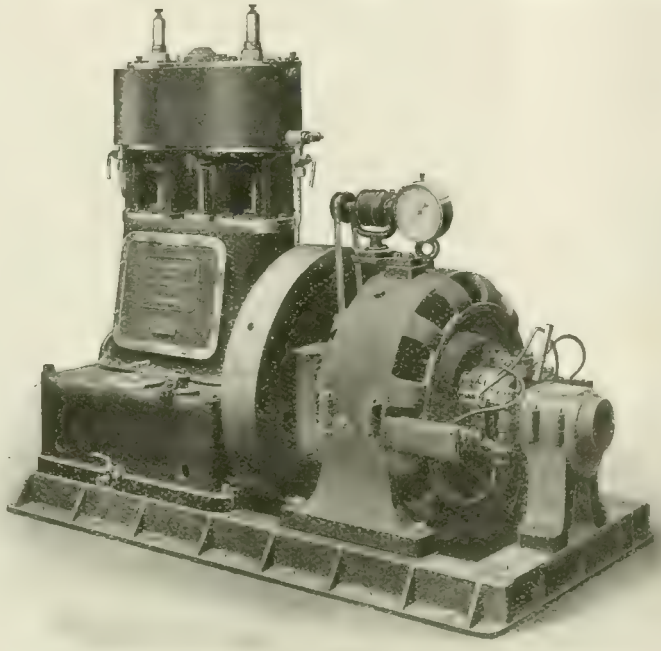
STEADY RUNNING.

PROVED ECONOMY.

BEST WORKMANSHIP.

HIGHEST REPUTATION.

LOW STEAM CONSUMPTION.



ADVANTAGES:

LOW COST.

RELIABILITY.

HIGH EFFICIENCY.

GOOD GOVERNING.

SMALL FLOOR SPACE.

MINIMUM ATTENTION.

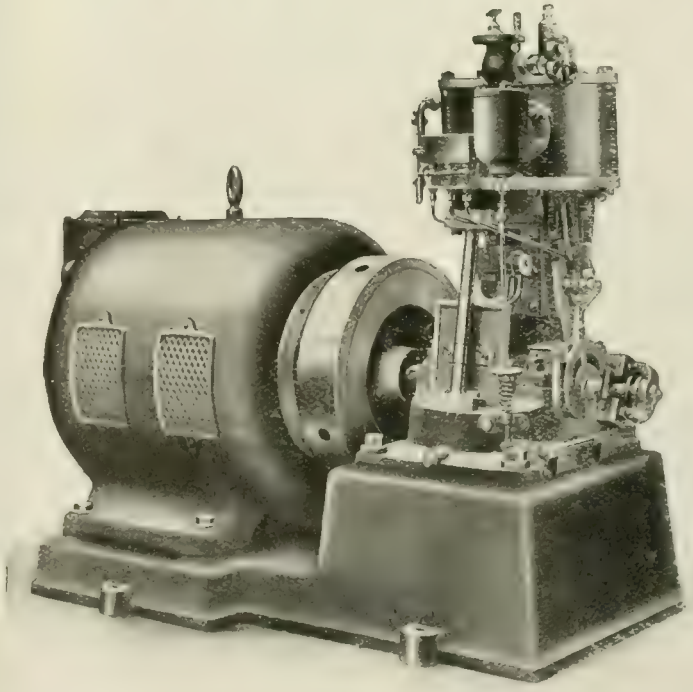
Two-Crank Compound Engine and Dynamo, 40 B.H.P., 500 R.P.M., Ship Lighting Set, as supplied for Cunard S.S. Co. "Franconia," "Laconia," &c., &c. (22 Engines.).

Estab. 1852.

London Office: 8, Victoria Street, S.W. **BELLISS & MORCOM, Ltd., BIRMINGHAM.** Telegrams: "Belliss, Birmingham."

MAWDSLEYS LIMITED,

Zone Works, DURSLEY, GLOS.



DIRECT CURRENT DYNAMOS AND MOTORS FOR SHIPBOARD AND SHIPYARD USE.

SHIPLIGHTING DYNAMOS COUPLED TO EITHER STEAM OR PARAFFIN ENGINES.

VENTILATING SETS.

Agents for Clyde District: Messrs. PATERSON & SERVICE, 38, Bath Street, GLASGOW.
North East Coast Agent: Mr. G. MARLEY, 37, Side, NEWCASTLE-ON-TYNE.

HOWDEN'S FORCED DRAUGHT

Adopted by the principal Steamship Companies in the World.

Over 16,250,000 I.H.P. Fitted.

FANS. :: FAN ENGINES.
FURNACE FRONTS. RETARDERS.
SILLEY PATENT FASTENINGS FOR SMOKE BOX DOORS.
STEAM TURBINES, AND HIGH SPEED, ENCLOSED, FORCED LUBRICATION ENGINES.

JAMES HOWDEN & CO., LTD.

HEAD OFFICE AND WORKS:

Scotland Street, Glasgow.

BRANCH OFFICES:

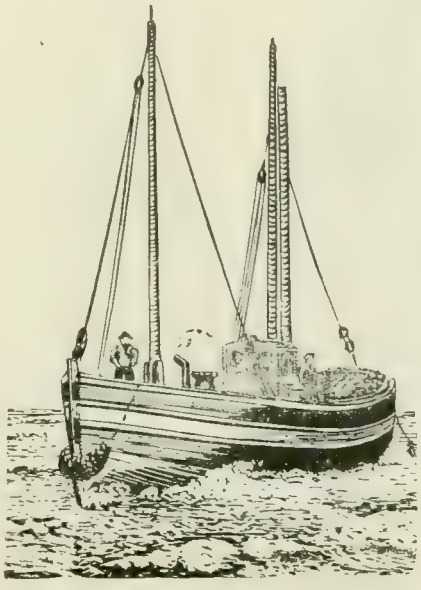
London: 9, Billiter Square, E.C. 3.

London: Caxton House, Westminster, S.W. 1.

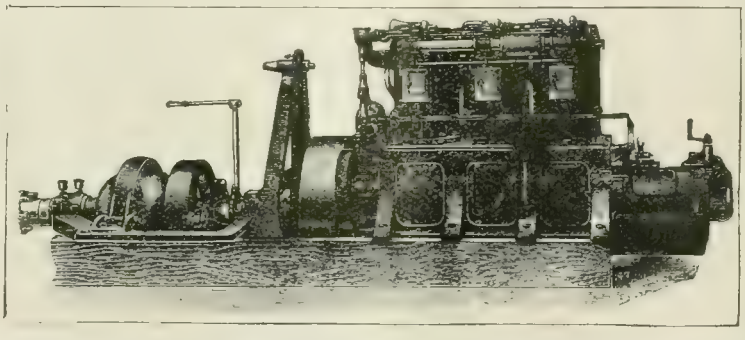
Manchester: 86, Cross Street.

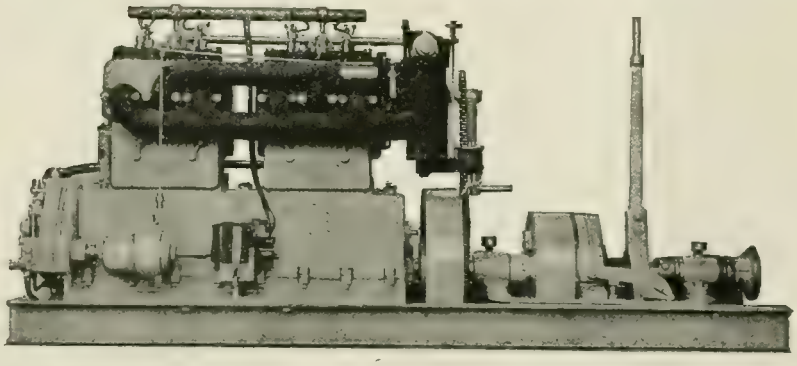
"GARDNER" MARINE ENGINES

5 B.H.P. to 220 B.H.P.



NORRIS, HENTY & GARDNERS, Ltd.,
87, Queen Victoria Street, London, E.C.
WORKS: PATRICROFT, LANCS.
701-802, Tower Buildings, Liverpool; Milburn House, Newcastle-on-Tyne; 66, Scottish Temperance Buildings, Belfast; 124, St. Vincent Street, Glasgow. :: ::





GLENIFFER MARINE ENGINES.

PETROL, PARAFFIN, NAPHTHA OR ALCOHOL. 4 to 50 B.H.P.
AS SUPPLIED TO THE ADMIRALTY.
STANDARD ENGINES BUILT TO LLOYD'S & BOARD OF TRADE REGULATIONS.

SPECIALITIES:

SHIPS' EMERGENCY LIGHTING SETS
AND MOTOR LIFEBOAT ENGINES.

Full particulars from—

GLENIFFER MOTORS, LTD., Anniesland, Glasgow.

LIFE SAVING AT SEA.

The Hercules Wooden Collapsible Lifeboat Proves its Efficiency.

Helensburgh,
18th June, 1917.

British Marine Motor & Launch Co., Ltd.,
Whiteinch,
GLASGOW.

Dear Sir,

I have not the slightest objection to your using the verbal report which I made to Captain Wilson commending your Hercules Lifeboat, indeed I consider I am doing a public service in drawing attention to its merits. As you are aware, your boats had a very stern and searching test on the occasion of the loss of the TSS "Cameronia" and we found the Hercules boats thoroughly efficient and seaworthy and capable of carrying numbers very largely in excess of those allotted to the boats by Board of Trade measurement. In at least one case 115 men were accommodated in a Hercules boat the capacity of which was rated at 66 adults by the B.O.T. Measurement.

It is my considered opinion that it was largely owing to your boats safely carrying these large numbers that the loss of life was, in view of the numbers carried, so small.

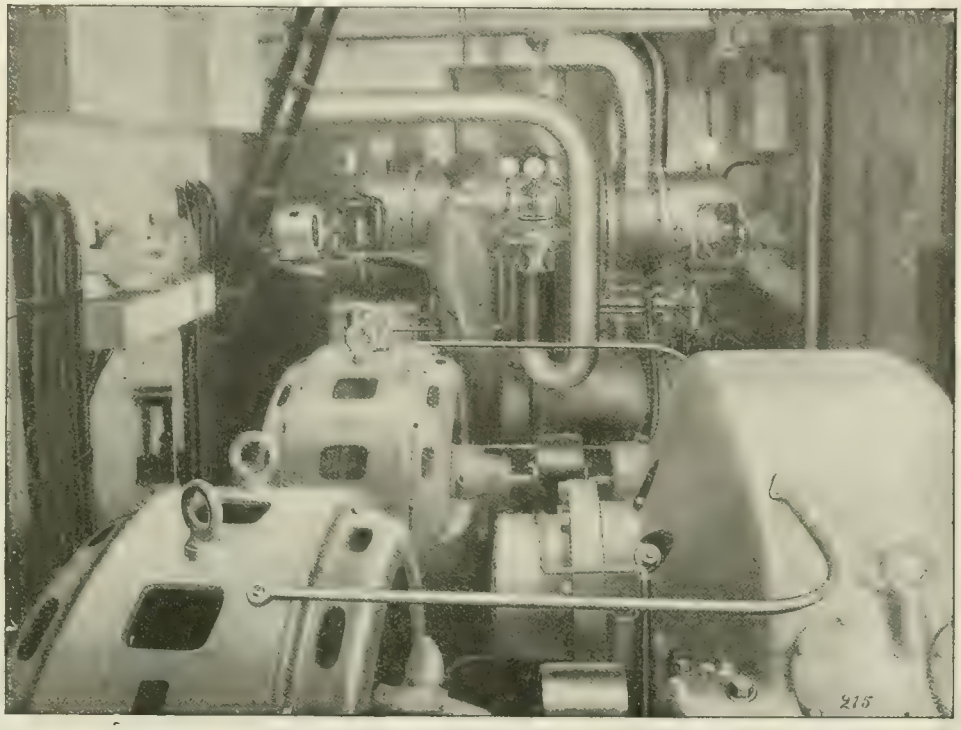
At the first opportunity after the ship was equipped with your Hercules boats I experimented with them to test their carrying capacity. Boat used was No. 6A, which was certified to carry 66 persons. I put 100 of the crew on her. These were well accommodated and on the boat being sent away from the ship with this complement on board, it was possible to swing the oars and keep her under moderate weigh. I also trimmed the boat to one side, listing so that the gunwale strake was immersed. To do this we had to transfer 31 men from port to starboard. A small amount of water found its way into the boat from below the collapsible pieces, an amount that could easily be dealt with by baling.

With no one on board the boat floated at 18 inches free-board - measured from top of gunwale strake. With 100 persons on board she had 9½ inches. . . .

Yours very truly,
(Signed) David Wm. Bone,
Captain of the "Cameronia."

SAY YOU SAW IT IN THE "S. & S. R."

LJUNGSTROM TURBO ELECTRIC



View of Engine Room of S.S. "MJOLNER" fitted with

Ljungstrom

Steam Turbines.

38% more economical in service

than sister ship with Reciprocating Engines.

55,000 S.-H.P. now under construction for Marine Propulsion

THE BRITISH LJUNGSTROM MARINE TURBINE CO., LTD., 22, BILLITER STREET, LONDON, E.C. 3.

Telegraphic Address: "PORTUARY, LONDON." Telephone No.: AVENUE 2648.

J. SAMUEL WHITE & Co LTD

TORPEDO CRAFT.
SHALLOW DRAFT AND STERN-WHEEL VESSELS.
VESSELS for PATROL DUTIES, REVENUE SERVICE, Etc.
STEAM AND MOTOR LAUNCHES OF ALL DESCRIPTIONS.

STEAM AND MOTOR LIFEBOATS.

FIREFLOATS AND SPECIAL SERVICE CRAFT.

"WIGHT" SEAPLANES AND AEROPLANES.

LONDON OFFICE, 28, VICTORIA ST. S.W. TEGRMS. "CARNAGE LONDON." TELPHN. 4507. VICTORIA.

EAST COWES. I. W.

HEAD OFFICE. TEGRMS. "WHITE EAST COWES." TELPHN. No3. COWES.

DAY, SUMMERS & CO., LTD.,

Northam Ironworks, Southampton.

Engineers and Shipbuilders. - -
Tug Boats, Paddle Boats. - -
Cargo Boats and Passenger Steamers.

2 Slipways for Repairs and 2 Sets Steam Sheers.

SPECIALITIES—
Land and Floating Traversing Sheers. Patent Hauling-up Slipway Machinery. Steam Ferry Bridges.

Twin-Screw Tug "NEPTUNE." 1600 I.H.P.

"Reina Victoria Eugenia"
Compañia Trasatlantica de Barcelona.
This Beautiful Steamship was decorated and furnished by
WARING & GILLOW LTD.

WARING & GILLOW LTD
Furnishers & Decorators to H.M. the King.

BOLD STREET
LIVERPOOL

164-180, OXFORD STREET, LONDON, W.

DEANSGATE
MANCHESTER

BROWNS STEERING GEARS

Steam, Hydraulic and Electro-Hydraulic

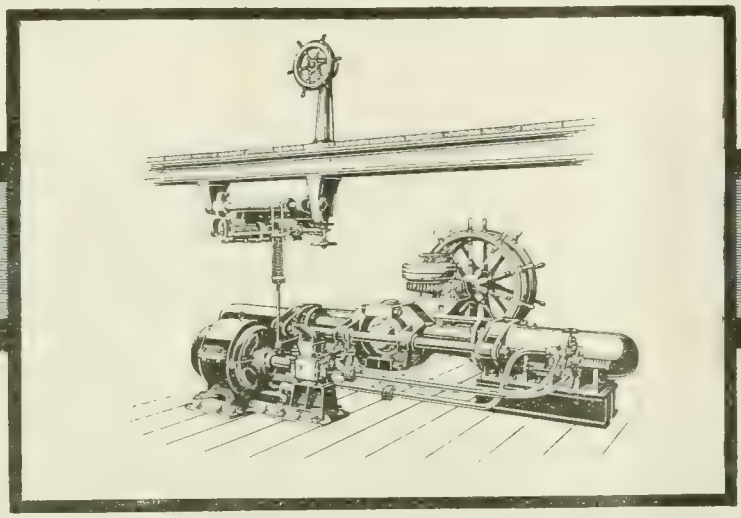
IRON FOUNDERS

Telegrams
HYDRAULIC
CODE
A·B·C·

TELEMOTORS
FOR
STEERING & HELM SIGNALS

DIRECT ACTING REVERSING
& TURBINE CONTROL ENGINES

COMPLETE INSTALLATIONS
OF HYDRAULIC CARGO
WORKING GEAR FOR SHIPS



Williams—Janney Brown Electro-Hydraulic Steering Gear With Hand Gear Combined.
"SILENT & ECONOMICAL."

BRASS FOUNDERS

Telephones
CENTRAL
8931-2
CODE
A·B·C·

WILLIAMS—JANNEY BROWN
ELECTRO-HYDRAULIC
STEERING GEARS.
BOAT HOISTS, CRANES,
WINCHES, ETC. . . . .

Under Licence from
The Variable Speed Gear, Ltd.,
London, S.W.

BROWN BROTHERS & Co., LTD.
ROSEBANK IRON WORKS
EDINBURGH

Liverpool Office
LIONEL TAYLOR & CO.,
Royal Liver Buildings

Newcastle Office
H. K. DENTON & CO.,
Prudential Buildings.

LIVINGSTONE & COOPER, LTD., HESSLE, HULL.

Telegrams:
"Stability, Hull."

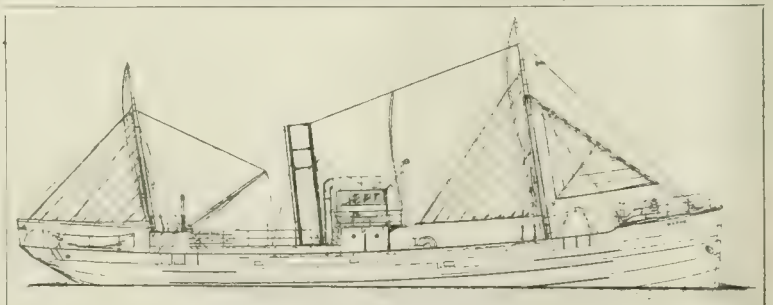
SHIPBUILDERS & ENGINEERS.

Telephones:
83 Nat., Hessle; 1031 Corp., Hull.

SPECIALITIES.

TRAWLERS	TUNNEL STEAMERS
TUGS	STERN WHEELERS
COASTERS	LIGHT DRAUGHT BARGES
CARRIERS	SHIPMENT JOBS
LAUNCHES	PASSENGER TENDERS

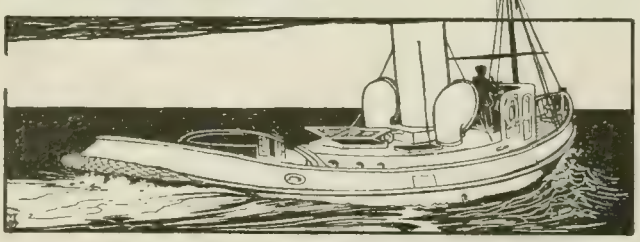
8 Berths. Up to 230 ft. long.
Excellent Launching Facilities. Estimates Given.



STEAM TRAWLER "MARNE," 125 FT. B.P.

SHIPBUILDERS & ENGINEERS

J. CRICHTON & CO., LTD.



SALTNEY SHIPYARD,
CHESTER.

TUGS, BARGES, LAUNCHES: ALL TYPES OF SHALLOW-DRAFT VESSELS FOR RE-ERECTION. HEAD OFFICE, TOWER BUILDING, LIVERPOOL.

COAL AT

CADIZ

CIA. GENERAL DE CARBONES, S.A.

Isaac Peral 17,
CADIZ,—SPAIN.

Telegrams: "Sanderson, Isaac Peral, Cadiz."

ORAN

SOCIÉTÉ FRANCO ANGLAISE DE CHARBONNAGES,——— ORAN.

Palais Consulaire,
ORAN.

Telegrams: "Gardet, Palais Consulaire, Oran."

Agents:

THE ANGLO-SPANISH COALING CO., LTD.,

Cambrian Buildings,
CARDIFF.

Telegrams: "Deposito, Cardiff."

Best Welsh and/or Durham supplied. **Quick Dispatch.**

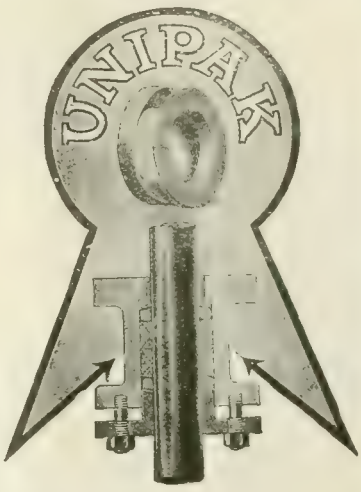
THE RELIABLE BRITISH PACKINGS & JOINTINGS.

THISTLE TRADE MARK REGD

"THISTLE" PACKING
(Regd. Trade Mark 230552.)
Suitable for Steam Temperature up to 750° F. Superheated and high pressure steam, etc. Specially suitable for all glands on Boiler Tops, Expansion glands, etc.

"TAURIL" JOINTING
(Regd. Trade Mark 243897.)
Suitable for High Pressures and Superheated Steam, Ammonia, Alkalies, etc. In Standard Sheets or Cut Joints to Specification for all classes of work

"UNIPAK" RINGS
(Regd. Trade Mark 366982.)
A Revelation of Efficiency.
A scientifically constructed Steam and Water Gland Packing with an efficiency of 99·9 per cent. Supplied in four grades:—Standard—Metallic—Hydraulic—Compressor.



FERGUSON & IMPSON, Ltd.,
Engineers and Merchants,
REGD. OFFICE:—
50, Wellington Street, GLASGOW.
104, Minories, LONDON, E.
NEWCASTLE: 17, Broad Chare, Quayside.
LIVERPOOL: 67, Stanley Street.
Works: GOVAN ROAD, GLASGOW.

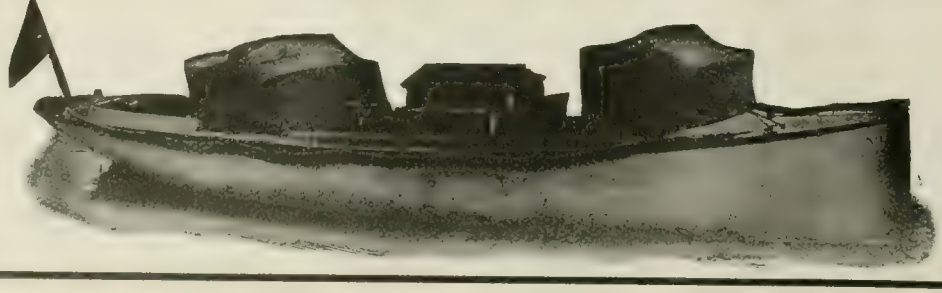
WM. CHALMERS & Co., Ltd.
RUTHERGLEN, Nr. GLASGOW.
Telegrams: "Scow, Rutherglen." Cables: "Scow, Rutherglen."
Telephone: 459 Rutherglen. Code: A B C 5th Edition.

Light Draught Shipbuilders & Engineers.

BARGES
YACHTS
LAUNCHES
TUGS
STERN WHEELERS
DOCK GATES
SIDE WHEEL STEAMERS
FLOATING CRANE PONTOONS
FLOATING DOCK PONTOONS
HOPPER BARGES (Side or Bottom Discharging)
SAND PUMP DREDGERS

SEAMLESS STEEL BOAT CO., LTD., Wakefield
SOLE MAKERS OF SEAMLESS STEEL Lifeboats, Cutters, Launches.

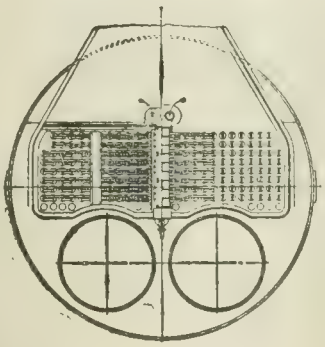
Motor launch, 34 ft. 6 in. O.A. × 8 ft. 0 in. × 3 ft. 9 in., fitted with 15 B. H. P. Paraffin Motor,



folding canvas storm hoods forward and aft, house over motor, steering wheel, etc., speed 9 miles per hour.

ECONOMY in coal

You can save about 20% of your coal bill by equipping your boilers with the



"Robinson" Marine Superheater

a consideration that should appeal very strongly under present conditions. Besides being the most economical—this Superheater is the most reliable and generally satisfactory on the market. It never leaks—and all its parts are readily accessible for cleaning and inspection. The "Robinson" Marine Superheater is designed for high or moderate degrees of superheat. It is a British invention, British made, by British Capital.

The Superheater Corporation, Ltd., Palace Chambers, Westminster, S.W. 1.

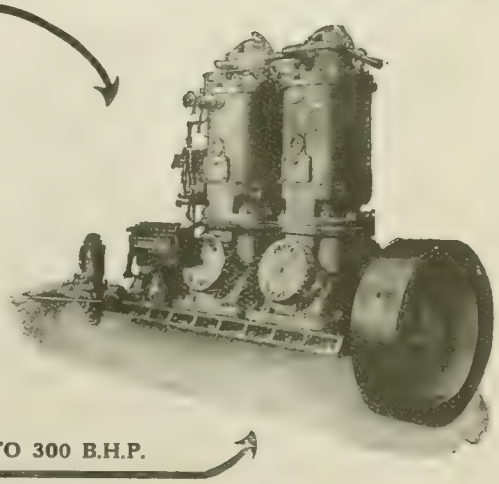
PETTER CRUDE OIL ENGINES

SEMI-DIESEL DIRECT-REVERSING MARINE TYPE.

Embody the latest practice in design with the finest British workmanship and materials, backed by over 20 years' experience in Oil Engine construction.

DIRECT-REVERSING BY COMPRESSED AIR.

NO WATER INJECTION, LOWEST FUEL CONSUMPTION.



For full particulars apply to

PETTERS LIMITED, MARINE DEPARTMENT,
73, Queen Victoria Street, London, E.C.

WORKS: YEOVIL, ENGLAND. MADE IN SIZES FROM 10 TO 300 B.H.P.

Keep an Independent Power Unit

You never know when you may require a Motor Salvage Pump.

These Pumps are made for hard and continuous service and are supplied with Hose and Connections for immediate use and will start and run at a moment's notice. Discharge capacities from 100 to 700 tons per hour. Will run on Petrol or Paraffin.

Full particulars and prices from:—

GEO. WRIGHT,
Engineer,
ETHERINGTON BUILDINGS, HIGH STREET, HULL.
Nat. Tel.: 679 and 2022. Telegrams: "Deliver," Hull.

GRAHAM'S
PATENT LOUD-SPEAKING NAVAL TELEPHONES

ADOPTED BY THE BRITISH ADMIRALTY, FOREIGN GOVERNMENTS
AND THE LEADING STEAMSHIP COMPANIES.

The Telephone Without Equal for Every Class of Naval Construction.

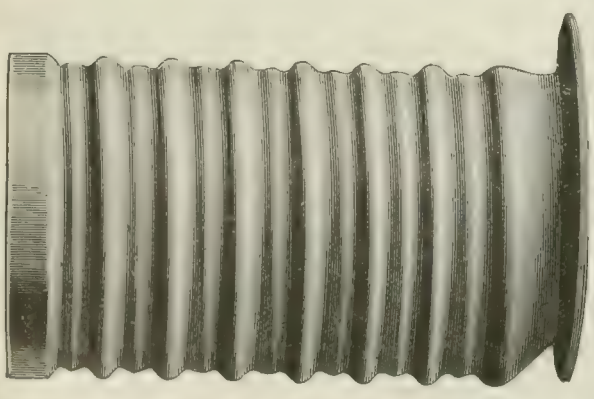
Graham's Instruments are Original Models Designed and Manufactured by Specialists.

ALFRED GRAHAM & COMPANY,
ST. ANDREW'S WORKS, CROFTON PARK,
TELEGRAMS: "NAVALHADA, BROCK, LONDON." **LONDON, S.E.** TELEPHONE: SYDENHAM, NO. 952.

REFRIGERATING MACHINERY
NH^3 and CO^2 Systems.

Insulation of Every Description.

THE LIVERPOOL REFRIGERATION CO., LTD.,
Colonial House, LIVERPOOL; London House, New London Street, E.C.



DEIGHTON'S PATENT FLUE & TUBE Co., Ltd.
Telegrams: "Flues, Leeds." Telephone: 1674 (National).

MAKERS of DEIGHTON, MORISON and FOX TYPE of
CORRUGATED FURNACES
For MARINE and LAND BOILERS.

FULL PARTICULARS AND CATALOGUE ON APPLICATION.

No other Type of Furnace has a Greater Heating Surface per foot run than the DEIGHTON Section.

VULCAN WORKS, PEPPER ROAD, HUNSLET, LEEDS.

SAY YOU SAW IT IN THE "S. & S. R."

CAMBRIAN NAVIGATION SMOKELESS STEAM COAL.

(On British and Foreign Admiralty Lists.)

RECOGNISED AS THE BEST QUALITY
— OF CARDIFF STEAM COAL. —

PROPRIETORS:

CAMBRIAN COLLIERIES LTD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Offices: 31, GREAT ST. HELENS.
Telegraphic Addresses: "Cambrian, Cardiff." "Glamorgan, London."
Telephones: Cardiff 3280; London 4316 & 4317 Avenue.

SHIPPERS:

THOMAS & DAVEY, CAMBRIAN BLDGS., CARDIFF.

'HOOD'S MERTHYR' STEAM COAL

(On British and Foreign Admiralty Lists.)

FOUNDRY AND FURNACE COKE.

SULPHATE OF AMMONIA, TAR.
No. 2 & 3 RHONDDA LARGE, THRO & SMALL COALS.

PROPRIETORS:

GLAMORGAN COAL CO., LD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Offices: 31, GREAT ST. HELENS.
Telegraphic Addresses: "Glamorgan, Cardiff." "Glamorgan, London."
Telephones: Cardiff 3280; London 4316 & 4317 Avenue.

SHIPPING AGENTS:

LYSBERG, LTD., CAMBRIAN BLDGS., CARDIFF.

NAVAL MERTHYR SMOKELESS STEAM COAL.

(On British and Foreign Admiralty Lists.)

PROPRIETORS:

NAVAL COLLIERY CO. (1897) LD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
London Agency: 21, ST. MARY AXE.
Telegraphic Address: "Naval, Cardiff."
National Telephone: 3280. London 3304 City.

SHIPPING AGENTS:

L. GUERET, LTD., CAMBRIAN BLDGS., CARDIFF.

BRITANNIC MERTHYR STEAM COAL.

PROPRIETORS:

BRITANNIC MERTHYR COAL CO., LTD.

Regd. Offices: CAMBRIAN BUILDINGS, CARDIFF.
Telephone: Cardiff 3280. Telegrams: "Britannic, Cardiff."

SHIPPING AGENTS:

THOMAS & DAVEY, CAMBRIAN BLDGS., CARDIFF.

SUSPENSION BULB FURNACE.

UNIFORM SECTION.

Board of Trade Constant for Suspension Bulb Furnace
15,000.

Strongest form of Furnace.
Highest factor of safety.

Board of Trade Highest Constant for Other Corrugated Types
14,000.

Greatest diameter of Furnace ever officially tested to collapse.

Full particulars on application to—

THE LEEDS FORGE COMPANY, LTD., LEEDS.

London Office—CAXTON HOUSE, WESTMINSTER. MR. J. W. HAWLEY, Representative. Telegraphic Address—"ELEFFCO, LONDON."

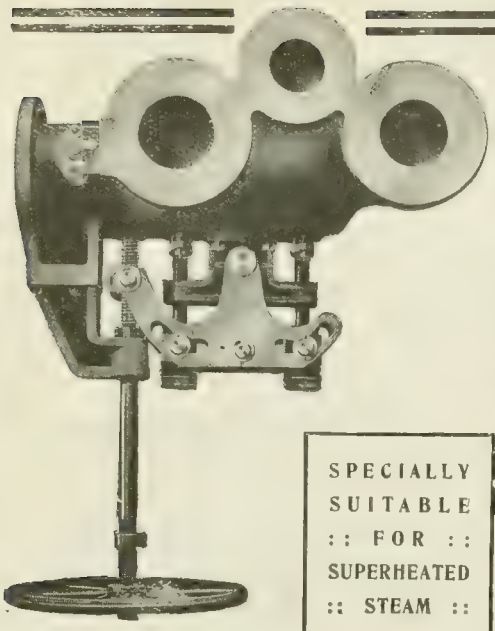
REFRIGERATING MACHINES

CO_2 and Ammonia Systems.

L. STERNE & CO., LTD.,

The Crown Iron Works, GLASGOW.

London Office: DONINGTON HOUSE, NORFOLK STREET, W.C.



ESTABLISHED 1862.

Copies: A.B.C. (5th Edition) Limited.

COCKBURNS
LIMITED
CARDONALD, GLASGOW

"THE WORLD-RENOWNED STEAM VALVE SPECIALISTS.

SPECIALLY SUITABLE :: FOR :: SUPERHEATED :: STEAM ::

POSITIVELY CONTROLLED AHEAD AND ASTERN

MANŒUVRING VALVE

(D. Cockburn—Macnicoll Patent).

POSITIVE OPENING AND CLOSING OF VALVES IN PROPER SEQUENCE.

NO POSSIBILITY OF TWO VALVES BEING OPENED SIMULTANEOUSLY.

FULL PARTICULARS AND PRICES ON APPLICATION.

TELEGRAMS:
"COCKBURN, GLASGOW."

TELEPHONE:
No. 361 GOVAN (2 lines).

PACKING AND STEAM TRAPS

The Finest in the World. Fitted on Britain's Largest Liner.

R.M.S. "AQUITANIA."

THE UNITED STATES METALLIC PACKING CO., LTD., Soho Works, BRADFORD, YORKS.

LONDON: 116, Fenchurch St. LIVERPOOL: 632, Royal Liver Buildings. GLASGOW: 52, St. Enoch Sq.
NEWCASTLE: 2, Collingwood St. SWANSEA: Pembroke Bldgs. Belfast, Hull, Bristol, Cardiff, etc.

BRIGGS' BITUMINOUS COATINGS

HAVE BEEN APPLIED TO

THE TWO LARGEST FLOATING DOCKS, THE FOUR LARGEST VESSELS, AND THE TWO BIGGEST BRIDGES

IN THE WORLD.

SPECIFY AND INSIST ON GETTING **BRIGGS'.**

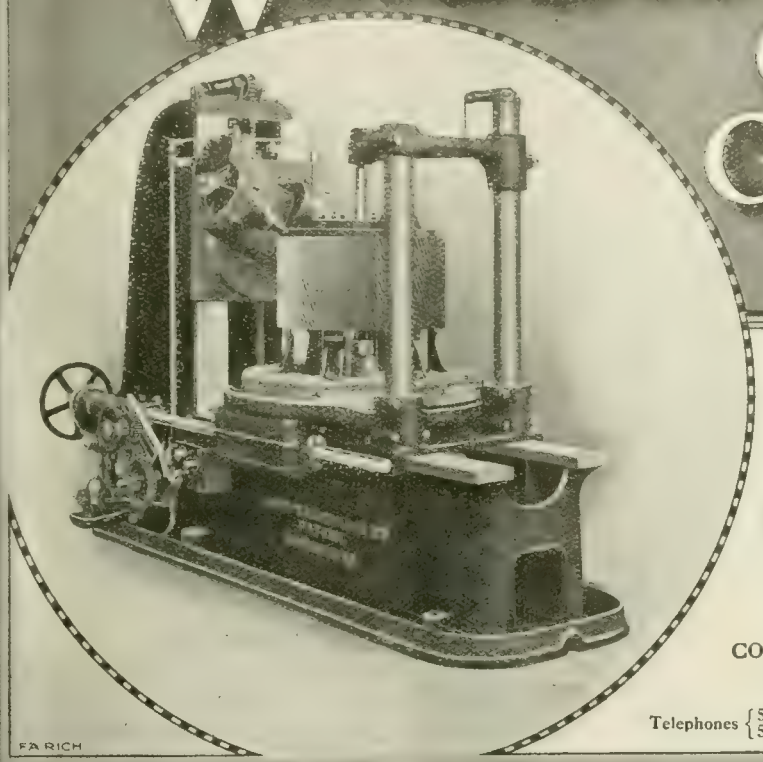
THE WORLD'S RECORD ANTI-CORROSIVES.

Patentees and Sole Manufacturers:

W. BRIGGS & SONS, LTD.,
DUNDEE & LONDON.

United States Agency:
BRIGGS' BITUMINOUS COMPOSITION CO., INC., 17, Battery Place, New York.

WALLWORK Gear Generators



WALLWORK

HY. WALLWORK & Co. LTD.
MANCHESTER

(ESTABLISHED 1856)

CONTRACTORS TO H.M. GOVERNMENT, &c.

Telephones {5200 / 5201} CITY

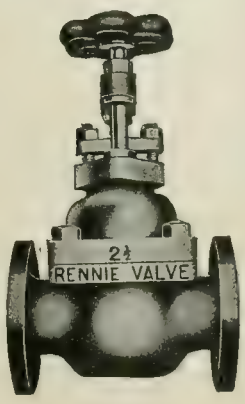
Telegrams: "Foundry," Manchester

Rennie Stop Valve.

ADOPTED BY THE LEADING SHIPPING COMPANIES.

PASSED BY BOARD OF TRADE.

PASSED BY LLOYD'S.



All Types.

½ in. to 6 in.

A really tight valve for all purposes and conditions. The only valve on the market with accessible seat.

LICENSEES & MANUFACTURERS:

Telephones: 3600 (4 lines).

Telegrams: "Brass, Leeds."

S. DIXON & SON, LTD.

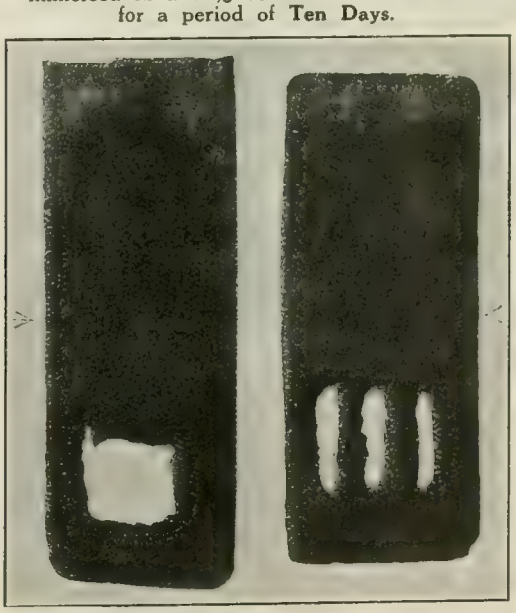
Brassfounders,

LEEDS.

Of Interest to Shipowners.

"BITUFERRI."

FAC-SIMILE OF TEST MADE ON HOOP IRON
immersed in a 16% solution of Nitric Acid
for a period of **Ten Days.**



The plates were painted with "Bituferri," and, after drying, parts were scraped on both sides with a knife laying bare the metal. After ten days' immersion the BARE METAL was entirely eaten away, but the "BITUFERRI" was untouched, not even the gloss being destroyed.

THE PLATES WERE IMMERSED TO THE DEPTH OF THE ARROW.

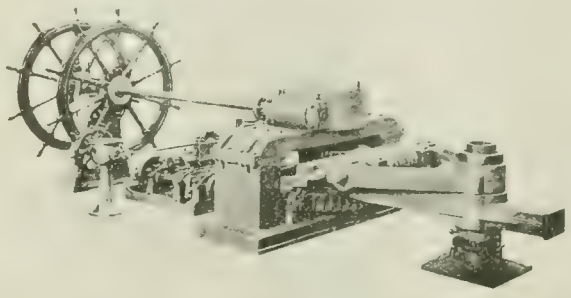
Sole Manufacturers:

ARCHD. H. HAMILTON & CO.,

Telegrams: "Satisfy." **POSSILPARK, GLASGOW.**

SAY YOU SAW IT IN THE "S. & S. R."

HARFIELD'S STEERING GEAR.



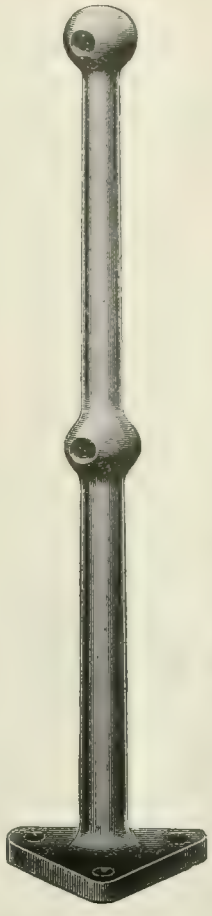
Also Makers of Windlasses for Warships and Merchant Steamers, and other specialities, including — Iron and Gunmetal Castings. —

CONTRACTORS TO BRITISH AND FOREIGN ADMIRALTIES.

HARFIELD & CO.,

Blaydon Iron Works, NEWCASTLE-on-TYNE.

STANCHIONS



PRICES AGAINST SPECIFICATIONS.

EDWIN RICHARDS & SONS, Ltd.

PORTWAY WORKS, WEDNESBURY.

Agents on N.E. Coast—

SAUNDERS, TODD & CO., Maritime Buildings, Newcastle-on-Tyne.

FERODO

FABRICS

provide the engineer with a spark-proof friction surface having a coefficient of friction double that of metal. They are used exclusively for braking purposes on the London and Paris Underground Railways, and despite the enormous friction, have eliminated all danger from fire. Ferodo fabrics can be used in the most exposed positions and give a uniform coefficient of friction even when soaked with seawater. Secure the greatest efficiency by fitting Ferodo linings to all brakes and clutches, but see the name stamped on every foot of the genuine.

We invite enquiries for Ferodo floorings and stair-treads. They outwear metal or rubber and are absolutely non-slipping.

The Herbert Frood Co., Ltd.,

Works: CHAPEL-EN-LE-FRITH.

Contractors to the War Office and Admiralty, London General Omnibus Co. and Underground Electric Railways of London and Paris. **List "S.R."**

'Phones: 19 and 20 Chapel. Wires: "Friction, Chapel."

We hold Stocks at London, Birmingham, Belfast, Bristol, Cardiff, Edinburgh, Glasgow, Liverpool, Manchester and Newcastle.

S

BULL'S METAL

Screw Propellers, Rolled bars for shafts, Forgings.

HIGH TENSILE BRONZE

Castings, Forgings, Rolled bars.

WHITE METALS

Tempalto for packings working in superheated steam.

Bull's White Metal "B" for lining.

BULL'S METAL & MELLOID CO., LTD., YOKER, GLASGOW.

J.D. Insulating & Refrigerating Co., Ltd.

3, COOK ST., LIVERPOOL.

J.D.

The J.D. System of Insulation for Cold Storages and Ships' Chambers

Has many advantages over the ordinary methods, of which the following are the most important:—

FIRE PROOF.
ODOUR PROOF.
RAT AND VERMIN PROOF.
PERMANENT.
EASILY CLEANED.
DAMP AND FROST PROOF.
ROT PROOF.
SANITARY PROOF.
EFFECTIVE.
ERECTION EASY.
SIMPLE, RAPID AND ECONOMICAL.

Send for Illustrated Booklet,

Or better still, tell us your requirement and we will advise you as to the best scheme to meet your case.
ALL KINDS OF INSULATION WORK UNDERTAKEN.

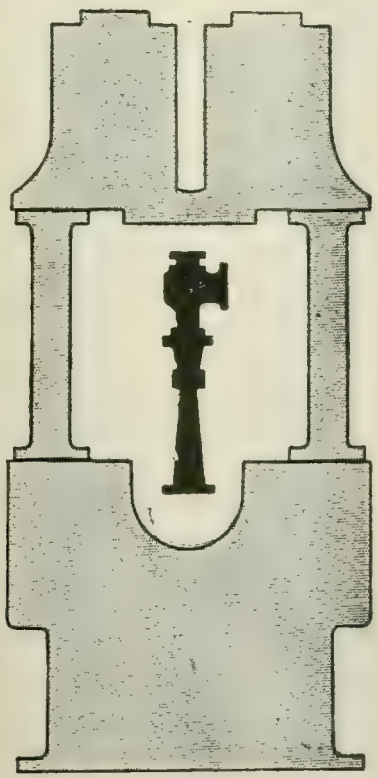
Agents to the **ANGLO DELTA SLAB CO., Ltd.**

The MIRRLEES WATSON Co. LTD.

SPECIALISTS IN CONDENSING PLANTS

SCOTLAND STREET GLASGOW

MIRRLEES-LEBLANC MULTIJECTOR AIR PUMPS



COMPARATIVE SIZES OF MULTIJECTOR AND ORDINARY RECIPROCATING AIR PUMP

Send for Illustrated Catalogue

R. & Ltd. R.

Reliable Dock Cranes

Electricity as a motive power has proved immensely cheaper than steam for Dock and Harbour Cranes. Such cranes are seldom employed continuously throughout the day; fuel is thus wasted when standing idle and when getting up steam. Also neither engines nor boilers are economical.

AN ELECTRIC CRANE AVOIDS ALL THE ABOVE LOSSES AND VERY SOON PAYS FOR ITSELF.

RAILWAY AND HARBOUR PLANT

PATENT ELECTRIC LUFFING CRANE
as supplied to the
UNION OF SOUTH AFRICA.

SEAPLANE LAUNCHING APPARATUS

RANSOMES & RAPIER, LTD.

DEPARTMENT V.

32, VICTORIA STREET, WESTMINSTER, S.W.

TRIPLEX Safety GLASS

AS SUPPLIED TO THE BRITISH NAVY FOR

BRIDGE SCREENS WIRELESS CABINS SKYLIGHTS CHART TABLES
BRIDGE SHELTERS SIDE LIGHTS ILLUMINATORS : : Etc. : :

N.B.—
TRIPLEX SAFETY GLASS
EVEN WHEN CRACKED
STILL REMAINS
AIRTIGHT and WATERTIGHT

Telephone: REGENT 1340.

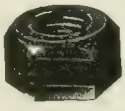
THE TRIPLEX SAFETY GLASS Co. Ltd. — TRIPLEX SAFETY GLASS — 1 ALBEMARLE ST. W.1 — LONDON.

GREATER EFFICIENCY WITH
CONSIDERABLE SAVING IN
SUBSTANCE AND WEIGHT

Telegrams:
"SHATTERLYS, PICCY, LONDON."

BLACK AND BRIGHT BOLTS AND NUTS, ALSO ENGINEERS' PINS, SET SCREWS, COACH SCREWS, ETC.

Also Mfrs. of The
"HELICOID" LOCK-NUT.
A COIL OF STEEL.
Vibration actually tightens the grip.
Made from ⅜ in. to 2¼ in.



Bolts and nuts made from ½ in. diameter and up.

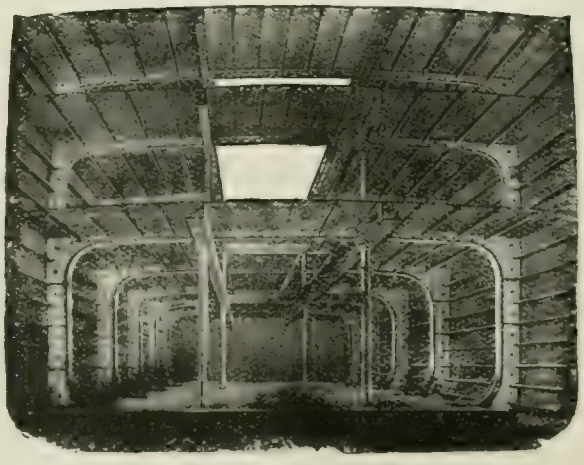
Also Mfrs. of
WROUGHT IRON FENCING & GATES, WIRE FENCING, HURDLES, etc., also CHILL & GRAIN ROLLS, CASTINGS UP TO 20 TONS.

BAYLISS, JONES & BAYLISS, LTD.
WOLVERHAMPTON.
LONDON OFFICES & SHOWROOMS: 139/141, CANNON STREET, E.C.

"ISHERWOOD SYSTEM OF SHIP CONSTRUCTION"

Suitable for ALL TYPES of Vessels.

Increased Strength.
Increased Capacity for Bale Goods.
Increased D.W. Carrying Capacity.
Improved Ventilation.
Reduced Cost of Maintenance.



Reduced Vibration.
672 Vessels Built or being Built, representing about 5,000,000 gross reg. tons.
285 Bulk Oil Carriers, representing about 2,604,000 gross reg. tons.

J. W. ISHERWOOD,

4, LLOYD'S AVENUE, LONDON, E.C.
And at 17, BATTERY PLACE, NEW YORK.

Agents for Great Britain: S. C. CHAMBERS & CO., 3, King Street, LIVERPOOL.

SHIPBUILDING AND SHIPPING RECORD
A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

PUBLISHED EVERY THURSDAY AT
QUEEN ANNE'S CHAMBERS, WESTMINSTER, LONDON, S.W. 1.

Branch Offices—
GLASGOW: 87, UNION STREET. NEWCASTLE: LLOYD'S BANK CHAMBERS.
NEW YORK: WOOLWORTH BUILDING.

Telegraphic Address: "RECORDSHIP, VIC., LONDON."
Telephone No.: 2247 VICTORIA.

Subscription, including regular weekly and special issues, published from time to time, payable in advance and postage free:—

British Isles..... £1 5s. 0d.
Elsewhere..... £1 12s. 0d.
Single Copies..... Sixpence.

The Editors will be glad to consider articles and paragraphs submitted by competent writers. All accepted contributions will be paid for. Whilst every care will be taken to return unsuitable articles, photographs and drawings (when a stamped addressed envelope is enclosed for that purpose) the Editors cannot hold themselves responsible for the safekeeping of unsolicited contributions.

VOL. X.] THURSDAY, JULY 12, 1917. [No. 2.

CONTENTS.

EDITORIALS:
Compensation for Requisitioned Ships..... 25
Coal Transport Order..... 25
Classification and Insurances..... 25
South African Prospects..... 25
Seaports as Storage Places..... 26
Public and the Shipowner..... 26
Deadweight Capacity..... 26
Workers and Exclusive Control.... 26
Shipbuilding After the War..... 27
Canadian Shipbuilding..... 27
Waste-Steam Pipes..... 27
Freeboard and Subdivision..... 27
Limits of Speed..... 27
The Chancellor and the Shipping Industry..... 28
Sub-division..... 29
Superheated Steam..... 29
Publications Received..... 30

MISCELLANEOUS:
Excess Profits and Shipping..... 31
Abnormal Profits and Abnormal Risks..... 31
Glasgow Harbour Rates Increased 32
Application of Danish Insurance 33
The Development of Machinery in the U.S. Navy during the Past Ten Years..... 33
State Encouragement of Shipbuilding in Italy..... 36
The First Motor Ships Burning Crude Oil..... 36
Development of the Swedish Lloyd..... 36

STEAMSHIP APPLIANCES:
An Automatic Emergency Lighting and Wireless Installation.... 37
Linkleters' Well-Decked Navigable Life Rafts..... 38

GENERAL NEWS SECTION..... 39
SHIP SALES..... 47
SHARE TABLE..... 48

An Index to the Ninth Volume of SHIPBUILDING AND SHIPPING RECORD, *covering the issues from January 4 to June 28, 1917, is presented as a Supplement to each copy of this week's issue.*

STILL another aspect of the allocation of Admiralty payments on account of requisitioned ships has come before the Courts. In this case the vessel, which had previously been under time charter was lost by war risks, and Mr. Justice Rowlatt held that the time charterers could not claim in respect of the assumption by the Government of the war risk on the ascertained value of the ship. The vessel in question was the *Rio Colorado*, which, when she was requisitioned by the Government, was running under a long time charter. She passed into the use of the Government under the form of charter known as T99, by which they assumed war risks on her ascertained value. Under the original time charter the owners were to insure. When the Government assumed the war risks they made it unnecessary for the owners to insure against those perils. The Admiralty charter had not the effect of destroying the time charter. When the ship was lost, what then were the respective rights of owners and charterers in regard to the allocation of the compensation? The ship, said Mr. Justice Rowlatt, had been converted into money by the same event as determined the interest of the charterers, and the owners took the money as they would have taken the ship had the charter been determined by some other event, or by efflux of time. He did not, however, debar the charterers from making any claim which they considered they could put forward so long as they did not claim in respect of the assumption by the Government of the war risk on the ascertained value of the ship. A considerable body of legal decisions has now been formed on this difficult question of the respective rights of owners and charterers under Government requisitions.

Compensation for Requisitioned Ships.

Two different sets of directions have been issued by the Coal Controller. One, which we published last week, has reference to the sale of coal for shipment to destinations outside the United Kingdom. The other has relation to the transport of coal by railway for internal consumption in this country, and by dividing Great Britain into 20 areas, which shall, so far as circumstances permit, be made entirely dependent on their own resources of coal, it is sought to diminish very materially the haulage on the railways. What we particularly desire to draw attention to in regard to these directions for the internal transport of coal, is that they do not affect (1) coal conveyed to a port for shipment, whether for export, coastwise or bunkers; (2) coal conveyed otherwise than by public railway from the colliery; and (3) anthracite. Another point to remember in connection with the internal transport order is that where special qualities or varieties of coal are required by an industry, special arrangements may be made by means of certificates for its conveyance from outside or distant areas.

Coal Transport Order.

Now that French underwriters have followed the example of their British *confrères* in defining their requirements as to the classification of vessels on which insurances are taken through the open cover system, considerably greater importance will be attached by owners to the necessity for seeing that their vessels do not fail to satisfy the requirements of the surveyors in whichever registry their vessels may be entered. Briefly, the underwriters have agreed to accept no vessel under an open cover whose classification is not perfectly satisfactory from an insurance point of view. That they are justified in assuming this attitude cannot be disputed. Few underwriters have sufficient technical knowledge to form their own opinion of a vessel's suitability for a certain trade from her structural details. It therefore falls to the lot of the surveyors, on whose report classifications are made, to keep underwriters informed of the condition in which vessels are kept. The Lloyd's and Veritas methods are exceptional in the matter of affording this information, and owners who maintain their vessels at the standard required by these registers need have little fear of harsh handling at the hands of their insurers.

Classification and Insurance.

Reference has already been made in these columns to the big extension scheme now being carried out at the principal South African ports, partly in accordance with the recommendations of the Dominions Royal Commission, which attaches great importance to the future of the Cape route, and partly to meet the requirements of the Union's trade. Old industries are gradually being developed, and new trades are about to be established, so that the future of the country, provided the canker of political unrest does not retard enterprise, seems well assured. We now hear that an automatic system of lighting is being installed around the coast. At one station a saving of approximately £400 a year has been effected, and, so far, no case of failure has yet been reported. One difficulty which, as we have already indicated, is a source of some concern to the Transvaal and Rhodesia, is the fact that two of their

South African Prospects.

most convenient ports, Beira and Delagoa Bay, are in Portuguese territory. To trade through Cape Town, Port Elizabeth, or Durban, naturally adds considerably to the cost of freight, and handicaps business. It is now, however, reported, although neither denial nor confirmation of the statement is forthcoming, that General Smuts may, during his stay in England, try to induce the Imperial Government to negotiate the exchange of "German" East Africa for the Mozambique Province, with a view to the latter territory being added to the Union. In this event, Delagoa Bay would be of the utmost advantage as regards the future of the country. There is nothing inherently improbable in the proposal, which, if given effect, would solve more than one thorny problem.

Seaports as Storage Places.

Dr. Alfred Lohmann (President of the Deutschen Ozean Reederei, Bremen) writes at length in the *Vossische Zeitung* urging that greater importance be attached to the accumulation of vast stores of goods and materials at German ports. Ports are not to be considered merely as transhipment stations for overseas traffic, but as the comparatively few doorways for ingoing and outgoing traffic, at which the natural accumulation of stores is to be encouraged so that there may be a reserve for domestic supplies in the event of war. Without such a reserve, internal economic conditions are thrown at once into confusion by the interruption of sea traffic, possibly with fateful consequences as regards the course of the war. Germany owes much to the reserves which she had in her ports on the outbreak of war, but the author considers that Germany must go yet further in future and fight English "warehouse trade," by making German oversea traffic entirely independent of English warehouses. This would naturally necessitate great extensions in the equipment of German harbours. Lohmann emphasises the importance to the German hinterland of seaport-warehouses as the basis of national security and well-being. In endorsing these views, *Hansa* points out the importance of inland waterways as feeders for the port-warehouses, and lays special stress upon the efforts of Hamburg to secure better connection with the south-eastern and north-eastern hinterland.

Public and the Shipowner.

A London newspaper, which is persistently severe on British shipowners, suggests that if the Government had, early in the war, taken over the Mercantile Marine, and fixed freights at a suitably low level, the prices of food and other commodities would not have risen. As, however, more than British-owned ships were engaged in the ocean transport of our supplies of various kinds, it is not easy to see how that could have happened. The truth is that the real solution of the whole problem of high prices has never been obscure, and that British shipowners themselves have persistently indicated it. In the early days of last year, it was pointed out by one who had a first-hand knowledge of the facts, that the cure was a definite restriction of imports. In 1915 there was a shortage of tonnage of about 33 per cent., and a reduction of only 16 or 17 per cent. in imports. The effect of that was, naturally, to put up freights, and, with the market practically free, so far as neutrals were concerned, nothing the Government could do in the way of freight controlling was calculated to neutralise it. If, however, they had taken their courage in their hands, and definitely restricted imports, freights would have come down of their own accord. Instead of doing so at once, however, they delayed until the harm was done, and then proceeded in the most circumlocutionary fashion to tackle the problem. British shipowners are certainly not to blame for what has happened, and the British public are less fair than is their usual habit in jumping to the conclusion that they are. But for the enterprise of owners in pre-war days—enterprise which the State seldom helped and often hindered—British sea-power would not be as magnificently effective as it is to-day. Yet all the return the State—and the community—can apparently think of making to them is seriously to handicap them in post-war competition.

Deadweight Capacity.

Descriptions of ships in charter parties have frequently given rise to disputes. Questions turning on the interpretation of deadweight capacity are not novel in the Courts, and Mr. Justice Rowlatt in the Commercial Court last week had to consider how far the deadweight capacity of a vessel expressed in a charter-party was to be taken as a measure of her cubic capacity. A ship, the *Freden*, was chartered in December, 1915, to load at Durham a full and complete cargo of maize. One of the clauses in the charter set out that the owners guaranteed the ship's deadweight capacity to be 3,200 tons, and freight was to be paid on this quantity. The fact that the vessel had a lifting capacity of 3,200 tons was not questioned. The charterers, in bringing an action, contended that they could not load this weight of maize in the vessel. The issue which Mr. Justice Rowlatt put in his judgment was whether the "ship's deadweight capacity," as expressed in the charter-party, meant her capacity to carry a stated number of tons of maize or her abstract lifting capacity. After an examination of the terms of the document he arrived at the conclusion that the lifting capacity was implied. The mention of the proposed cargo in another part of the charter has a legal and practical interest. Could it in this case be reasonably connected with or be regarded as introducing a qualification in relation to the expressed deadweight capacity? The judge did not find such a connection or qualification, and therefore he gave effect to the rule that "if there is nothing in the contemplated voyage or the contemplated cargo to give any special meaning to the guarantee, it will be treated as a guarantee of the carrying capacity of the ship without reference to any particular cargo." On this ground the action of the charterers failed.

Workers and Exclusive Control.

As we have more than once pointed out, the greatest obstacle to an improvement in the relationship of employers and employed is the attitude of the Socialist extremists who are, for purely political reasons, forcing what is called "the rank and file movement." These people, many of whom are not workers at all in the accepted sense of the term, do not desire an improvement in the relationship of Capital and Labour. As one of them explains in the course of some comments on the Reconstruction Sub-Committee's Report, "the demand of organised Labour is not merely for a measure of joint control, but for a measure of exclusive control." "The more active Trade Unionists are asking," he goes on to say, "that questions of workshop organisation and management shall be taken by the workers into their own hands and dealt with by workshop committees composed entirely of Trade Unionists." Nothing in the Sub-Committee's Report indicates that any reasonable Trade Unionist or federated employee believes such a thing to be desirable. Moreover, considering the conflict of Labour interests which exists in some industries—engineering for example—the harmonious working of exclusive committees of Trade Unionists does not seem to be possible. But the main objections to the idea are that as industry is organised the workshops and their machinery belong to the employers, and that it would be to all intents and purposes confiscation to take the organisation and management of them completely out of their hands in the manner suggested. Besides, does the record of Trade Unionism's interferences with shop organisation and management suggest that if "the more active Trade Unionists"—in other words the extremists—had their way, the efficiency of industry would be improved?

It ought not to be allowed to go unnoted by anybody engaged in the industry of the United Kingdom that most of the people who are developing overseas shipbuilding enterprises are of the opinion that after the war they will be able to compete with British firms on fairly equal terms. More than one American has said so. Our friends in Japan appear to be similarly optimistic. In the Dominion Parliament the other day, Mr. Hazen, the Minister of Marine, said he was confident that after the war the Canadian shipyards, as a result of their present prosperity and the experience gained, would be able to hold their own with British yards. Before the war, none of these industries was, without State-aid given directly or indirectly, able to hold its own against the United Kingdom's industry in respect of either prices or deliveries. We were, unquestionably, the quickest and the cheapest builders of ships in the world. We are still, probably, the quickest, although, in the light of some recent American records, it may seem rash to say so. Our costs of construction are also very likely lower than those of anybody else; they are, of course, very much higher than the pre-war level. They are, moreover, rising steadily through causes which are inoperative in those other lands, and the hope of our prospective rivals quite clearly is that they will continue to be very high for some time after the cessation of hostilities. While it would be exaggeration to say that the prospect is alarming, it is certainly serious enough to call for action. What seems to be desirable is some sort of reorganisation of the industry calculated to reduce costs of construction in spite of high wages. The Trade Unions would necessarily have a large say in any rearrangement of that kind, and it is time, we think, that they said it.

Shipbuilding After the War.

Although there is very good reason to believe that many of the reports now current about the progress of shipbuilding in Canada are much exaggerated, it is, nevertheless, undeniable that the industry there shows every promise of a big development in the future. Repeated efforts have, of late, been made to induce the Government to come to its assistance, and it was, in fact, thought that with the return of Sir Robert Borden, the Prime Minister, from his recent visit to the United Kingdom, the policy of the authorities would be announced. So far, however, nothing has been done, nor do discussions in the Dominion Parliament give any indication of what is likely to happen. At present, it is evident that one of the great difficulties in the way of an immediate expansion is the scarcity of steel, and it is, indeed, by no means improbable that, as a first step, the Government may decide upon the establishment of rolling mills. Mr. J. W. Morcross, Managing Director of the Canada Steamship Lines, and Director of Shipping Construction under the Department of Naval Affairs, is, as we recently pointed out, firmly of opinion that action in the matter is necessary, and Mr. Mark Workman, President of the Dominion Steel Corporation, has expressed a similar view. Evidently it is impossible to secure a sufficient quantity of raw materials, such as ore, and not until the war is at an end, and well over, can any improvement in this respect be reasonably expected.

Canadian Shipbuilding.

In fixing the waste-steam pipes from the safety valve on the boiler to the side of the uptake, care must be taken that any movements due to expansion and contraction, caused by fluctuations of temperature, do not set up a racking action at the root of the flange of the safety valve. The usual procedure is to fit a connecting pipe between the flange on the waste-steam side of the safety valve and the boiler casing near the uptake, this being secured to the waste-steam pipe, which runs up either forward or abaft the uptake to the atmosphere. It is this connecting pipe which if too rigid may set up the racking action referred to, and the consequences may be disastrous unless steps are taken to prevent or in some way or other to withstand it. This is clearly exemplified in the report of an inquiry into an explosion which occurred recently on a British ship, and which resulted in the death of one of the engineers. The valve chest ruptured circumferentially round the neck of the inlet branch immediately above the flange connecting it to the boiler. The upper portion of the chest, with its fittings, was forced upwards through a distance of 1 inch, and through the opening thus formed the contents of the boiler escaped. The cause of the explosion was the fracture at the root of the flange, the development of which, in the opinion of the Board of Trade surveyor, was assisted by the movement of the waste-steam pipe, owing to the manner in which it was led through the casing overhead. The method of counteracting this racking action is to strengthen the flange of the safety valve by the provision of fore and aft stiffening ribs, but it could also be prevented to a very large extent by the facilitating of the expansion and contraction of the waste-steam pipe by the fitting either of an expansion joint or of a U bend somewhere in the length.

Waste-Steam Pipes.

A point in connection with subdivision and freeboard which may have been overlooked by ship designers is the necessity of being very particular about the freeboard draught to which their subdivision calculations are made. Thus a vessel may be designed to a certain limiting draught—as determined by the exigencies of the particular trade in which the vessel will be employed. The subdivision may be arranged with this draught as basis and passed as correct by the Board of Trade. From considerations of depth of ship and size of superstructures a certain definite freeboard would be obtained from the Load Line Committee's report. The draught given by this freeboard may be considerably greater than that already determined from considerations of the vessel's trade. The freeboard which will be ultimately assigned by the Board of Trade is that which will give the draught exactly to which the subdivision calculations have been made, and not that which the Load Line Committee's report indicates. This points to the absolute necessity of being in no doubt as to the maximum draught which is expected from a vessel, and submitting the subdivision calculations on the basis of that maximum draught. In a vessel employed regularly in a given service, the nature of the cargoes carried is fairly well determined, and the storage of that cargo known. The maximum draught attainable by the vessel with a full cargo of the given density can be easily calculated, and the limiting draught thus determined. It may be, however, that an occasion might arise when a particularly heavy cargo had to be shipped and plenty of hold space might be available for this, but the amount carried would be limited by the freeboard assigned. In this case the Load Line Committee's freeboard would be of benefit, but the subdivision freeboard must not be exceeded. A subdivision in harmony with the deepest possible draught should be arranged for, wherever such is practicable.

Freeboard and Subdivision.

The late Sir Francis Elgar at one time remarked that in the early days of the Institution of Naval Architects it was believed by many that there was an absolute limit to the speed of a ship, and that this limit, and the speed which it is possible to reach in any vessel, was absolutely dependent upon the square root of her length. These ideas have been long since exploded, and it is now known that the only limit which may be set to the possible speed of ships is the ability of engineers and shipbuilders to get the necessary power into the vessels. Many years ago a model of a peculiar type of ship was tried by Froude at Torquay. This form was the idea of the Rev. Charles Ramus, the rector of Guildford. It consisted of forming the ship into two wedge-shaped bodies, one abaft the other; the object of the invention being to cause the ship to be lifted out of the water by

Limits of Speed.

the resistance of the fluid at high speeds. It is a peculiar fact that present day hydroplanes are somewhat similar in design to that submitted by Ramus. From his experiments, Froude calculated the effective horse-powers necessary to drive a ship of 2,500 tons displacement at various speeds, and the figures given were somewhat as follows:—for 10 knots, 1,000 effective horse-power; for 20 knots, 14,000 effective horse-power; for 30 knots, 44,000 effective horse-power; for 40 knots, 83,000 effective horse-power; for 50 knots, 124,000 effective horse-power; for 130 knots, 455,000 effective horse-power. Assuming that the effective horse-power was half the total installed, these results indicated that with 1,000,000 h.p. a speed of 130 knots could be obtained with this particular craft. The fastest vessels—motor boats of the hydroplane type have reached a speed of 40 knots, and it is by no means certain that the limit has been reached. In vessels of ordinary form of the non-lifting type a speed of almost 40 knots—certainly 38 knots—has been reached. The production of high power with small weight is enabling results to be achieved which even a very few years ago would have been considered incredible, and there is no evidence to show that the limits have been reached either in the ability of engineers to give still greater power with less weight of machinery or in the ability of shipbuilders to evolve still better forms.

THE CHANCELLOR AND THE SHIPPING INDUSTRY.

MR. BONAR LAW'S speech in the House of Commons, in which he defended Clause 19 of the Finance Bill, differentiating against shipping in the computation of excess profits, has drawn forth protests from the shipping community. Lord Inverclyde, in the course of moderately-worded comments on the utterance of the Chancellor of the Exchequer, repels what he properly describes as an uncalled-for attack on the shipping industry. Much stronger language could, with justice, be applied to the attitude of the Government of which Mr. Bonar Law is a spokesman. We have to remember in approaching that attitude that the present administration rests upon an *entente* with a considerable portion of the Labour party in the House of Commons, that it is represented in the Government, and that at the time when the existing combination was formed, rather disturbing reports were in circulation regarding the "nationalisation of shipping." These matters are not irrelevant to a situation in which the shipping industry is singled out for obnoxious differentiation in respect to the payment of excess profits duty. Mr. Bonar Law may have managed to score a temporary debating success by narrating a few of the results of his own lucrative investments in shipping. But he overstepped the limits of fair controversy when he put them forward by implication as a typical example of the profits which have been earned in shipping enterprises. We have to take the industry as a whole in dealing with matters of taxation. It has not earned huge profits on the scale of Mr. Bonar Law's investments, and it is, therefore, quite unjustifiable to cite them in the circumstances as he did. But the undue publicity which he has given to this matter will certainly not assist the Government in its relations to classes who do not understand the varying fortunes of shipping. The interruptions at Sir L. Worthington Evans' meeting with workers engaged in the engineering and allied trades at Manchester are certainly evidence that more reticence about an exceptionally fortunate investment would have been desirable.

So much lively public interest has been caused by these particular investments that we must go into the Chancellor's statement in some detail. He invested £8,110 in fifteen shipping companies under the management of seven different owners. We were told on the previous occasion on which he referred to the matter that this occurred when he was in business. Therefore we are justified in asking precisely what were the prospects of shipping at this particular time. Was shipping at that moment in one of its periodical phases of depression? If so, ships could be purchased at low values. That is a very important point, as it qualifies the whole statement as a commercial transaction. It appears that Mr. Bonar Law would have been satisfied with 5 per cent., or £405 on his investment. Was this satisfaction the result of his experience in this class of investment? If so, it shows that the normal return of shipping in peace time taken over considerable periods are not always so large as some people would have us suppose. For the year 1915 he, however, received £3,624 and for the year 1916, £3,847. In regard to one ship which was sold or sunk, and in which he had £200, he received on liquidation a cheque for a little over £1,000. From a company in which he invested £350 he received £1,050 out of a division of surplus capital. "That is the trade we are ruining," exclaimed the right hon. gentleman. There we have the old crude fallacious reasoning which constructs a sweeping generalisation on a few exceptional facts. Lord Inverclyde points out by way of a commentary that "no reference in the speech is made to requisitioned steamers or the return owners receive on their capital in such steamers which the Chancellor of the Exchequer must know are nothing like the return he states he has received on his shipping investments." It is a commonplace in the industry that the return on requisitioned ships is very meagre, and companies which have been subjected to considerable requisitioning are not amongst those which are the most profitable to shareholders. We should like to hear Mr. Bonar Law developing this point on facts more typical of the industry than those which he unveiled in his speech.

No reluctance has ever been shown by the shipping industry to contribute its fair share of taxation. It accepted the excess profits duty with full knowledge that the national circumstances required it. The economic aspects of this depletion of its capital resources, particularly in the period of national recuperation after the war were, of course, pointed out, and this consideration increases in force as the rate of contribution is being raised from 60 to 80 per cent. But Mr. McKenna's conception of an excess profits duty was that it should be a yield in relation to profits over the whole period of the war, and it was in order to introduce a proper balance that he arranged that the gains and losses of the various accounting periods should be set off one against another. That principle the present Government and the Chancellor of the Exchequer has thrown over. He refuses to be moved. He has indeed introduced an amendment into Clause 19 to meet what he considers are cases of hardship. Its effect is rather difficult to follow through the complicated circumstances of the industry. In Mr. Bonar Law's own words it allows the shipowner to take the standard rate of interest of 6 per cent. and to take also any loss he has made in the current year and, putting the two together, he would come under the arrangement by which he would get 80 per cent. of the two so put together. But he stands to the principle of Clause 19. If it is the case that the amendment gets rid of the bulk of the financial hardship, it means, as Mr. Holt afterwards put it, that the Clause ceases to have any value to the Treasury at all. "It is an argument which cuts both ways. What remains is the insult. There is no other word for it. It is an insult on a class of traders who have done their duty as honourably and successfully as any other section of the community."

The case and the circumstances of the shipping industry were put with vigour and cogency in the House of Commons. Mr. Leslie Scott admirably developed in detail the points put in the memorandum of the Shipowners' Parliamentary Committee, and particularly those as to building and purchase of ships at the high prices of the war. Mr. Leif Jones warned the Government that the object of the German submarine campaign was in large measure directed against the future supremacy of our mercantile marine, and that instead of encouraging shipowners to remain in business and build ships, the Government were driving men out of business. Mr. Houston repudiated by the quotation of freights the unworthy suggestion that the shipowner was deriving great profits from the transport of food, and he made a very good point in regard to the interruption of the repairs of ships. Mr. Pringle

drew some very relevant comparisons between the treatment being meted out to the farmers on the one hand and shipowners on the other. General Sir Ivor Philipps commented on the extraordinary procedure of the Government, Mr. McKenna, the late Chancellor of the Exchequer, was also a critic of the Clause. In appealing to Mr. Bonar Law to reconsider his proposal he made use of words which are worth noting. "I am sure," he said, "that its general effect is going to be far more pernicious in its influence upon the shipping industry than he is going to reap benefit from the satisfaction of those who think that shipowners have enjoyed too high prices. . . . We are now putting on a discriminating tax without enquiry into individual cases." We need not examine at any detail Mr. McKenna's interpretation of the pledge given to shipowners in acquiring ships at high war prices. As it was embodied in an Act of Parliament he says that the matter lies within the sphere of Parliament and not of an individual Minister. He asserts the freedom of Parliament, but he doubts very gravely the expediency of not adhering to the arrangement in the Act of 1915, as to regarding excess profits duty as being spread in effect over the transactions of the whole war period. A departure from such a pledge engenders doubt. But the real gravamen of his speech was the exposition of the inadequacy of the Government proposal to do justice on even-handed lines. An owner who has made his profits and sold out will retain his profits. The burden is to be borne by those who have continued to run their ships efficiently. If requisitioning has the effect which Mr. McKenna is justified in thinking it has in many cases, of causing shipowners to run at a loss, there is a premium on inefficient and lax management and on employing ships as little as possible. Let the Chancellor of the Exchequer sum up these circumstances, let him consider the financial support he has received from the shipping industry, not only in direct contribution to the Exchequer, but also in the War Loans, and let him give up Clause 19 altogether.

SUB-DIVISION.

IF any apology be necessary for the following simple statement on the requirements of the Board of Trade regarding the sub-division of ships, it is that the writer has been asked where such was to be found. The Bulkhead report is probably as clear and concise as it was possible to make it considering the ground covered and the work involved. Leaving out of account questions of strength and equipment, the report deals specially with the number and spacing of the bulkheads required. In the first place, a certain line was determined and named the *margin* line. This is placed three inches below the *upper* surface of the deck to which the bulkheads reach, called the bulkhead deck. In a ship floating at a stated draught with a given freeboard, a certain definite length can be flooded before the draught line becomes tangential to this margin line. This length was named the *floodable* length. Were the space flooded unoccupied by cargo, a smaller length would accommodate the amount of water necessary to bring the vessel down to the margin line than if the water was simply round about cargo or permeating it. Accordingly, some standard had to be fixed to make allowance for the increased length which could be flooded in spaces occupied by cargo. Two sets of curves were accordingly designed and presented with the report, one of which enables the floodable length with 100 per cent. *permeability* (or μ) to be determined, the other gives the floodable length for 60 per cent. μ. This latter standard gives a fair average value of the amount of space available for water in holds occupied by cargo.

In all types of ships there are different compartments for different purposes and certain definite permeability values were fixed for these. For example, 80 per cent. μ was fixed for all machinery spaces; 95 per cent. μ for spaces occupied by passengers, and so on, particulars of which will be found in the report. The average μ's of the spaces forward and aft of the machinery space and under the margin line must be found, and values for the floodable length curve for the particular permeability can be calculated from the values obtained from the curves for 100 per cent. μ and 60 per cent. μ (see *Shipbuilding and Shipping Record*, March 15, 1917, page 248). Having then obtained the floodable length curve for the proper μ values, it is necessary to multiply this by a factor named the *sub division* factor to enable the *permissible* length of the compartments to be obtained. In a vessel of 300 ft. in length engaged in a mixed cargo and passenger service, the *floodable* length equals the *permissible* length, that is, that the sub-division factor is unity. As the length of vessels are increased, and as they become more purely passenger ships and less of cargo, the sub-division factor becomes smaller, so that the sub-division becomes closer. For example, in a large passenger ship of 800 ft. in length the sub-division factor is ·33 ensuring the flooding of three compartments before the draught of the vessel bilged reaches the margin line. There are two curves given of sub-division factors named the "B" and "C" curves. The value to be adopted in relation to the "B" and "C" curves depends on what is termed the *criterion of service*. This is the mean permeability value of the complete ship, both above and below the bulkhead deck. The larger the number of passengers carried the greater will be the number of spaces with a large μ value and the closer will the sub-division factor approach those given by curve "C."

Certain limits are set to the length of permissible compartments, as also to the relative lengths of two adjacent compartments.

It is of importance to be particular about the character of the sheer of the margin line, and the standard sheer as given in the Load Line Committee's report, should be considered in conjunction with the requirements of the Bulkhead Committee.

Two other points may be indicated, viz., that the freeboard ratio is the most potent factor in determining the floodable length of ships, and if, in any particular case, greater lengths of holds are desired than can be obtained by the design considered, then either limitation of draught or increase in depth is probably the readiest way of procuring the desired lengths. The other point is that meantime the sub-division of purely cargo ships, or those carrying under 12 passengers, is unaffected by the Report, although certain recommendations regarding the strength of the bulkheads fitted are given.

SUPERHEATED STEAM.

IN a recent article on "Working Cycles of Heat Engines," published in the *Shipbuilding and Shipping Record*, June 14, it was shown that the cycle of operations in the modern steam engine was in close agreement in three of its four stages with the well known Carnot ideal cycle, and that the maximum possible efficiency of the steam engine is considerably less than the ideal when working between the same limits of temperature and with the losses occurring in practice due to cylinder condensation, wire-drawing, &c., the actual efficiency is generally about 60 per cent. of that obtainable with the ideal engine. Since, however, in engines working on the Carnot principle the temperature at which heat is given to the working substance should be the highest possible in order to obtain the highest thermal efficiency, it follows that the higher the temperature of the steam utilised in a steam engine the higher will be its efficiency, even if the losses remain proportionally the same, whilst if it can be shown that as a result of using steam at a higher temperature the losses are proportionally reduced, then the increase of efficiency will be proportionally greater.

Using saturated steam, that is, dry steam at the same temperature as the water from which it is produced, the upper limit of temperature depends upon the working pressure of the boiler, and this cannot be very considerably increased owing to the rapid increase of pressure which accompanies quite small increments in the temperature of saturated steam, and the difficulties which would be experienced in the construction of boilers to withstand these high pressures.

(This large increase of pressure which is necessary to produce quite a small increase of temperature will be rendered apparent if a curve is plotted from the values given in the tables of the properties of saturated steam taking the pressures horizontally and the corresponding temperatures vertically.) But there is another way open to us whereby the temperature of the steam can be increased whilst the pressure remains practically constant, and that is by "superheating" the steam. If the steam, after leaving the stop valve of the boiler on its way to the engine, is passed through a series of tubes placed somewhere in the furnace gases, its temperature will be raised whilst its pressure will remain about the same, being in direct connection with both boiler and engine. This series of tubes forms what is called a superheater, and the difference between the temperature of the steam leaving the superheater and the saturation temperature corresponding to the pressure in the boiler is the number of degrees of superheat. The number of degrees of superheat obviously depends upon the number and the length of the tubes comprising the superheater.

The steam thus enters the engine at a higher temperature than it would have done if no superheater had been installed, and as a result there will be an increase of efficiency as already pointed out by analogy with the Carnot cycle. There is, however, another very beneficial result attending the use of superheated steam. It is well known that owing to the ebullition of the surface of the water in the boiler, and owing to the movement of the boiler itself, a certain amount of water spray passes over with the steam, that is, the steam is wet, and the presence of this water leads to many troubles in the engine, in addition to which it is a fruitful cause of further condensation in the cylinder. But no matter how badly a boiler may be priming, the wet steam on passing through the superheater is first of all dried and then superheated, so that when superheated steam is employed, it is certain that on entering the engine the steam is absolutely dry.

There are some engineers who are content to let the superheater do nothing else but merely dry the steam, whilst others in addition to this subsequently give to the steam a large number of degrees of superheat. This gives rise to two distinct types of superheaters. Firstly there is the low temperature superheater in which the wet steam from the boiler is passed through a series of short tubes placed somewhere in the furnace gases, in which it is dried and its temperature raised a small amount, say, 20 to 40 degrees above the saturation temperature. Secondly, there is the high temperature superheater consisting of much longer tubes in which the steam is dried and then raised from 150 to 250 degrees above the temperature in the boiler. In the first instance the gain of efficiency is due entirely to the fact that the steam on entering the engine is dry and that during the initial stages of the expansion there is no condensation, although towards the end of the expansion both in a turbine or in a triple-expansion reciprocating engine some of the steam will condense. In the second instance the gain of efficiency is greater, since it is due not only to the fact that there is practically no condensation throughout the expansion, but also to the much higher initial temperature of the working substance. But there is a corresponding grave disadvantage attaching to the use of high temperature superheated steam, and that is the difficulty of dealing with high temperatures in the engine itself. In the reciprocating engine, the cylinder castings of which are comparatively simple, little trouble is caused by distortion due to unequal temperatures, but great care must be paid to the packing of the glands and to the lubrication of piston and piston rods. In the turbine, owing to the complicated castings necessary and consequent upon the very small clearances permissible between the blade tips and the casing, any distortion either of the stator or of the rotor due to unequal expansion may lead either to cracking of the casting or to stripping of the blades. Hence for marine work where reliability is of prime importance, it would appear as the result of actual practice that the low temperature superheater is considered more suitable than the high temperature type.

PUBLICATIONS RECEIVED.

[*A short notice of any publication does not necessarily preclude the subsequent appearance of a longer review.*]

The Principles of Apprentice Training, with special reference to the Engineering Industry. By A. P. M. Fleming, M.I.E.E., Mem.A.I.E.E., and J. G. Pearce, B.Sc. (Eng.). London: Longmans, Green & Co., 39, Paternoster Row, E.C.1. xiii + 202 pp. 8vo. Price 3s. 6d. net.

One of the greatest and most far-reaching effects of the war is the manner in which it has made us realise the supreme importance of industrial efficiency; the problem has been thrust before us by the dire circumstances of this colossal struggle between the resources of nations, but we also realise that after the clash of arms has ceased, the struggle will still continue, and that national supremacy will still be synonymous with industrial efficiency. The most important factor to be considered in order to increase industrial efficiency is the human being. Raw material may be readily obtained and of the best quality; the machines that operate upon it may be so ingenious that labour is reduced to a minimum, but it is the hand that operates the machine and which is responsible for the many processes necessary for the production of the finished article from the raw material that decides the question of the efficiency of the whole process from the commercial point of view. Thus we are beginning to realise that success in the race for industrial supremacy will depend largely upon the success with which we select, train and utilise, the workers in every industry. The successful utilisation of the worker will only be possible after careful training, and it is necessary that the most careful selection of the individual shall be made in order that only those who will be able to obtain the greatest benefit from the training shall be called upon to receive it. It is of the utmost importance then, to select, if possible, those individuals who are best suited by inherent capabilities to spend their lives as workers in a certain industry, and, having made the selection, to train them so that they shall become of the utmost value to that industry, and to show how these two problems can best be solved is the object of this book.

The book has an unusual value because it treats the subject from the broad national standpoint and not only from the narrower one of efficiency of any one particular craft or industry. The boys of the nation are to be so educated that they may be led to adopt those occupations to which they are naturally suited, and their preliminary education in the elementary schools of the nation as well as that higher specialised education which they must receive when they are apprenticed to a particular trade, must be framed not only with the idea of producing a good workman, but also with the idea of moulding the young man into a good citizen as well. With that end in view, the improvement of the system of physical education is advocated, and it is urged that a larger amount of time should be devoted to games and other means whereby the corporate faculty is developed, for it is only by individuals being able to realise at times that they are but parts of a greater organism—the works in which they are employed—that the highest industrial efficiency can be obtained; or, with still larger vision, that the welfare of the country can be developed.

Again, whilst the object of the training of the apprentice is to assist in the production of skilled workmen, the authors point out that many schemes for the training of apprentices fail because they tend to fit those receiving the training for the higher positions in their trade, leading them above the artisan class to what may be called the administrative class.

We have touched upon one or two of the many difficulties which are almost inextricably woven with the problem, and for an original and forceful treatment of many others we cordially recommend our readers to study this book. It is divided into four parts, the first of which deals with the economic aspect of the problem, the second treats of the relation of primary education to the problem, and suggests certain readjustments of the present system with a view to facilitating that vocational selection which is the subject of the third part, and also with a view to rendering the boy better able to absorb and benefit by the specialised apprentice training, which is the subject of the fourth part.

By way of showing what can be done, a very full account is given of the scheme which is in operation at the works of the British Westinghouse Company and of the results which have been obtained, and these, in so far as they can be determined, certainly justify the plea for a more complete education of all apprentices, especially those apprenticed to the engineering trades.

EXCESS PROFITS AND SHIPPING.

The clauses relating to excess profits and shipping in the Finance Bill as amended in Committee are as follows:

Clause 20. (1) The Finance (No. 2) Act, 1915 (in this Part of this Act referred to as the principal Act), shall, so far as it relates to excess profits duty, apply, unless Parliament otherwise determines, to any accounting period ending on or after the first day of August nineteen hundred and seventeen and before the first day of August nineteen hundred and eighteen, as it applies to accounting periods ended after the fourth day of August nineteen hundred and fourteen and before the first day of August nineteen hundred and seventeen.

(2) Section thirty-eight of the principal Act shall, as respects excess profits arising in any accounting period commencing on or after the first day of January nineteen hundred and seventeen, have effect as if eighty per cent. of the excess were substituted as the rate of duty for sixty per cent. of the excess, or, in the case of an accounting period which commenced before that date but ends after that date, as if eighty per cent. were substituted for sixty per cent. as respects so much of the excess as may be apportioned under this Act to the part commencing on that date.

In calculating any repayment or set off under subsection (3) of section thirty-eight of the principal Act any amount to be repaid or set off on account of a deficiency or loss arising in any accounting period commencing on or after the first day of January nineteen hundred and seventeen, or, in the case of an accounting period which has commenced before that date but ends after that date, on account of so much of the deficiency or loss as may be apportioned under this Act to the part commencing on that date, shall be calculated by reference to duty at the rate of eighty per cent.

Any additional duty payable by virtue of this section in respect of a past accounting period may be assessed and recovered notwithstanding that duty has already been assessed in respect of that period.

(3) It shall be the duty of every person chargeable to excess profits duty, if he has not previously given notice of his liability to be charged with excess profits duty in respect of any accounting period, to give notice to the Commissioners within two months after the termination of any accounting period in respect of which he is chargeable, or, if the accounting period terminated before the passing of this Act, within one month after the passing of this Act.

If any person fails to give the notice required by this provision he shall be liable on summary conviction to a fine not exceeding one hundred pounds, and to a further fine not exceeding ten pounds a day for every day during which the offence continues after conviction therefor.

Clause 22.—(1) In computing the excess profits duty of any trade or business which consists wholly or partly of the business of shipping the provisions of subsection (3) of section thirty-eight of the principal Act (which relate to the repayment or setting off of duty on account of deficiencies or losses) shall not apply in relation to any deficiency or loss in any accounting period commencing on or after the first day of January nineteen hundred and seventeen, and in the case of an accounting period which has commenced before that date but ends after that date, shall not apply in relation to so much of the deficiency or loss as may be apportioned under this Act to the part commencing on that date: Provided that—

(*a*) where the shipping business is carried on merely as ancillary to the principal trade or business, the provisions of this section shall not apply;

(*b*) where the trade or business carried on does not consist wholly of shipping, and the part which does not consist of shipping is not merely ancillary to the business of shipping, such apportionment of any deficiency or loss shall be made by the Commissioners as may be necessary to limit the application of this section to such part of the business as consists of shipping; and

(*c*) if in any such accounting period as aforesaid there has been a loss or the profits have not reached the point which would have involved liability to excess profits duty if the percentage standard had been adopted, the same amount shall, as respects the deficiency or loss or so much thereof as is affected by this section, be repaid or set off under subsection three of the said section thirty-eight as would have been repaid or set off if the percentage standard had been adopted.

(2) Any appeal under subsection (5) of section forty-five of the principal Act on any question arising under this section shall be to the special Commissioners.

(3) In this section the expression "business of shipping" means the business carried on by an owner of ships, and for the purposes of this definition the expression "owner" includes any charterer to whom a ship is demised.

ABNORMAL PROFITS AND ABNORMAL RISKS.

Neutral shipping profits in 1916 were considerably greater than in 1915, although freights were lower in the summer of last year than during the latter half of 1915, although expenses increased continuously, and although owners were subjected to many Government restrictions in the operation of their vessels and had to pay heavy war profit and other taxes. In 1915, profits were generally about equal to the share capital. Naturally, these enormous profits have called forth a good deal of protest from the population of neutral countries suffering under a scarcity of food and high prices. As a matter of fact, the latter are not due entirely to high freights. The highest freights have generally been obtained in other service than oversea traffic to and from the neutral countries concerned, and foodstuffs and materials have mostly been taken to those countries at much lower freights.

Abnormal profits have been gained at abnormal risk. For instance, the insurance premium was often 8 per cent. in 1916, and averaged 5 to 6 per cent. The number of losses has increased more or less steadily and delays have become more serious, due to difficulties of manning and coaling and to detention in belligerent countries. Individual vessels have frequently worked without profit, and though, in the aggregate, large owners have done extraordinarily well, some of the smaller firms owning only one or two vessels have had chequered experiences. The risks of war have been particularly serious in such cases. Numbers of Norwegian, Swedish and Danish owners lost their only vessel or vessels in 1916, and although the insurance generally covered the book value of the vessels with a very handsome margin, it was generally quite insufficient to provide new vessels of equal tonnage, and the only option was to dissolve the company or suspend its operation. About 50 Scandinavian firms were dissolved for this reason during 1916 and the early part of this year. Shareholders received 100 and 200 per cent., or even considerably greater final dividends, but this represented the final wave of prosperity, for no new company could circumvent the scarcity and dearness of tonnage which compelled the dissolution of the established concerns.

The difficulties in the way of replacing lost vessels has affected large owners in similar manner, though not to quite the same extent. Under the abnormal conditions which have existed during the past 18 months or two years, the loss or sale of a vessel has meant the sacrifice of great profits, at least during the time elapsing before another vessel could be secured at ever-increasing expense.

In this connection, reference may be made to some data given by *Svensk Sjofartstidning* concerning the receipts of an old-established firm of owners, in 1916, and the ratio of these receipts to the present value of the vessels concerned. The profits realised were, on a comparatively small share capital, not corresponding to the present value of the vessels. Indeed, the capital would have to be three or four times as great in order to replace existing vessels at 1916 prices, and on this basis the net profit for 1916 is not so very high. The company's fleet consisted of four vessels A—D, to which a

fifth (E) was added last autumn. Particulars of the vessels and of their insurance values are as follows: —

Vessel and year built.	Tonnage, gross d.w.	Insurance value. 1/1/16 to 31/3/16 £	Insurance value. 1/4/16 to 31/12/16 £	Premium paid in 1916. Ordy. £	War. £	Total. £
A—1899 ...	1819/3050	27,600	38,600	2,255	4,580	6,835
B—1903 ...	1527/2550	24,900	33,100	1,950	7,400	9,350
C—1885 ...	1537/2280	13,800	22,100	1,605	4,010	5,615
D—1883 ...	1452/2140	13,800	22,100	1,640	4,740	6,380
E—1902 ...	1635/2600	From 1/10/16	44,200	1,200	2,800	4,000

Had the vessels been insured to the price for which corresponding vessels could have been obtained in 1916, the insurance value and premiums would have been as below, *i.e.*, the total expenditure on premiums would have been £45,350, compared with £32,180 (an increase of 41 per cent.):—

	Insurance value. Jan.-June. £	Insurance value. July-Dec. £	Premium. Ordy. £	War. £	Total. £
A ...	83,000	110,500	4,120	7,550	11,670
B ...	60,900	83,000	2,740	8,220	10,960
C ...	49,750	66,200	3,330	7,000	10,330
D ...	44,250	60,900	2,850	5,510	8,360
E ...	—	88,400	780	3,250	4,030

We have still to allow, say, 5 per cent. interest on the additional capital expenditure which would have been needed to provide the vessels in 1916 (as compared with normal prices). The allowances under this heading are:—Vessel A, £3,500; B, £2,855; C, £2,470; D, £2,145; E, £814; Total, £11,785.

On these data we may base the following summary:—

	£
Actual net profit	91,700
Less insurance and interest (on full market value) ...	57,000
Surplus	34,700
Interest profit from 1916 receipts	830
Total net profit	35,530
Special taxes	8,300
Available for distribution	27,230

A capital of £325,000 would have been required to provide the vessels at current market prices, hence the £27,230 available for distribution represented only 8·4 per cent. (or only 5 per cent. after allowing for depreciation) on the capital corresponding to the market value of the fleet—which value is the one which has to be considered in the event of losses.

The conditions assumed in this example are particularly unfavourable, since vessels in service during 1916 could hardly be debited with more than the 1915 first-cost. However, the example is applicable to quite a number of shipowning firms established in 1916. Such firms disclose their difficulties and their weakness by their relatively high share capital. In 1915, a capital of £16,500 to £33,000 was good for a vessel of 3,000 to 4,000 tons, but in 1916 a concern contemplating operation of a medium-sized steamship had to be prepared to raise £50,000 or £60,000 capital. As a matter of fact, only 10 of the 40 shipowners founded in Christiania in 1915 had more than £55,000 capital, whereas 16 out of 36 new firms in 1916 exceeded this sum.

"The above example," says Hermann Steinert, in *Hansa*, "deserves special consideration in connection with German owners, who will have to pay very high prices for new vessels after the war. If this fact is not recognised and given effect in suitable State indemnities, German owners will only be able to show a profit if, and so long as, freights are abnormally high. Freights will probably be high for some time after the war, but not at the 1916 level, hence conditions will be worse than depicted in the example given by the Swedish journal."

Japan and Foreign Shipmasters.—In view of the recent regulation of the Department of Communications, Tokio, restricting the employment of foreigners on Japanese vessels, it is said that there are at present five Japanese steamers under the command of foreign shipmasters, namely, the N.Y.K.'s *Kitano* (Captain Cope) and *Hirano* (Captain Fraser); the T.Y.K.'s *Tenyo* (Captain Smith) and *Shunyo* (Captain Filmer); the M.B.K.'s *Takaosan* (Captain Gillespie); and the Kishimoto Steamship Company's *Kaijo* (Captain Salter).

GLASGOW HARBOUR RATES INCREASED.

Cost of Accommodating Larger Ships.

The steps which are at present being taken by the Trustees of the Clyde Navigation with a view to increasing the rates chargeable on shipping and goods at Glasgow Harbour are of more than local interest. Owing to the volume and variety of the shipping trade of Glasgow there are comparatively few large shipowning concerns in the country which do not require to send their vessels more or less frequently to the Clyde. For these firms a substantial increase in harbour dues is a matter of considerable importance. At the same time the lead given by the Clyde Trustees in regard to the question of rates will doubtless be followed by other port authorities throughout the country.

The Clyde Navigation Trust have two distinct schemes on hand for the increase of their rates. One consists of an application to the Board of Trade for an Order, under the Defence of the Realm Regulations, for authority to increase the rates to an extent not exceeding 33⅓ per cent. above the statutory maxima. This authority has now been granted by the Board of Trade. The increases, which came into operation on Monday last, are, however, to be regarded purely as a war measure, and are to remain in force for the period of the war only. The other scheme, which the Trustees have under consideration, is that application be made to Parliament for a permanent extension of the rating powers of the Trust. It is intended to apply for discretionary power to advance rates if necessary up to 25 per cent. over the rates quoted in the present schedule.

The reasons which have led the Trustees to seek an extension of their rating powers were fully stated by Sir Thomas Mason, chairman of the Trust, at a meeting of that body held in Glasgow last week. It had long been felt, he said, that, since there had been no alteration in the rates on ships for about 60 years, the time had arrived when ships ought to pay some extra contribution towards the rates. The rates on ships had been at their maximum for that long period, and of course the payers of rates on goods reasonably thought that when any advance took place in the working expenses of the Trust, or when heavier charges for interest, such as they were now suffering from, had to be met, the incidence of taxation was entirely wrong when the increased revenue had to be found from the rates on goods, and none of it from the rates on ships. That was a very fair argument, but there was another thing which shipowners neglected to look at, and that was that owing to the greatly increased size of ships entering the port, the expenditure to give them the necessary accommodation for a quick "turn round" had increased to a very great degree. Instead of shed accommodation 50 ft. wide, 100 ft. wide was now demanded. There were also questions relating to depth of water and strength of quays, which amounted to a capital expenditure of a very large sum, and he thought it was hardly fair that in the incidence of taxation the ship should escape any of that necessary expenditure which it was absolutely incumbent on the Trustees to provide if they were to maintain their position as one of the great ports of the kingdom. For the first time in the history of the Trust shipowners—at all events those representing shipowners on the Trust—had conceded the principle that allocated berths ought to be paid for, and it was satisfactory to find themselves in harmony as a Trust on that point. He would like to say to those who thought that perhaps the Trustees were trying to push matters too far in the way of raising the rates that there were two things the Trustees had kept before them. The first was that they must be in a position to meet all their obligations. It was absolutely necessary that their credit should be maintained in the high state which it occupied in the market at present, and he thought it was something for them to be proud of that they had been able to renew all their bonds at the same rate, 5 per cent., as the Government was doing. Other Trusts were paying more and offering more, while the Clyde Trust had all they wanted at the figure mentioned. The second matter the Trustees had to consider was that they must at all times endeavour

to provide for the workmen the best wages they could afford. The Trustees agreed to apply to Parliament for powers to increase their rates.

Increase of Rates in War Time.

An application was recently made to the Board of Trade by the Clyde Trustees for authority to increase the harbour rates to an extent not exceeding 33⅓ per cent., in order to meet the increase in working expenses due to war conditions. The Board of Trade have granted an Order in terms of the application made by the Trustees. Under this Order the Trustees have intimated :—

1. That upon vessels the rates be increased by 33⅓ per cent. above the rates levied, which are the maximum statutory rates.

2. That (*a*) upon those goods on which no increase of rates has been made by reason of having been levied at their maximum, the rates be increased by 33⅓ per cent. ; (*b*) upon those goods the rates on which have been increased up to their maximum, but by less than 40 per cent., the rates be raised to 40 per cent. above the rates levied prior to February, 1914 ; (*c*) upon those goods which have already been raised by 40 per cent. no further increase of rates be made.

3. That those of the rates on cranes which were at their maximum prior to February, 1914, be increased by 33⅓ per cent. ; and that the items which had been since raised up to their maximum, but by less than 40 per cent., be raised to 40 per cent.

4. That the rates for the ordinary use of the graving docks which have been increased up to their maximum, but by less than 40 per cent., be raised to 40 per cent.

5. That the rents and charges for Meadowside granary and the timber yards be increased by 10 per cent., making 40 per cent. above the rates in the tariff.

6. That the increased rates and charges, as shown on the revised table, come into operation on Monday, July 9.

APPLICATION OF DANISH INSURANCE.

A new law came into force in Denmark at the end of May concerning the manner in which insurance paid on total losses is to be utilised. By the new law, insurance must be devoted to providing vessels in place of those lost, exemption being granted only in special cases by ministerial permission. If a replacement vessel cannot be obtained at once, the insurance sum must be set aside. It may neither be paid out to shareholders nor applied to any other purpose than that specified above. Owners are required to report all total losses to the Ministry of Commerce within eight days from the time of their becoming known. Similar reports have to be made by insurance companies and claims may not be paid without the consent of the Minister of Commerce. The law is retrospective for all vessels lost since October 1, 1916, and will remain in force until the end of 1920.

This law will not much affect the older well-established Danish owners, but it will place in an extraordinary position those "mushroom" companies which have started work with one or two vessels, made huge profits for a short time and then lost their "fleet." Such concerns may well find it impossible to purchase replacement vessels, yet by the new law they may no longer go into profitable liquidation, as so many have done in the past. The retrospective clause is likely to cause a good deal of trouble. It is tolerably certain that many speculative concerns would not have been founded had the law which now applies to them been in force at the time of their flotation. One wonders what will happen in cases where a company has actually gone into liquidation on the strength of insurance receipts since October 1, 1916 ! The object of the new law is sound enough, viz., to prevent as far as may be any permanent reduction in the Danish merchant fleet, but the statute is likely to discourage further enterprise in the foundation of new companies. Under existing conditions in the shipping market and with the possibility that the war may end before private concerns could place themselves in a sound financial position, the new law may prove a blessing in disguise to Danish investors.

THE DEVELOPMENT OF MACHINERY IN THE U.S. NAVY DURING THE PAST TEN YEARS.*

During the period covered by this paper we have seen the reciprocating engine reach its highest point of development only to be superseded by the steam turbine, which, as in the case of the older engine, was directly connected to the propeller shaft. The direct-connected turbine has had only a short life, and at the present time is rapidly disappearing from the marine stage, its place being usurped by the mechanical and the electric reduction drives.

Coincident with these changes in the types of steam engines for propelling machinery has occurred the development of the internal-combustion engine as illustrated by that most important type, the Diesel engine.

Accompanying the advance in main propelling engines were improvements in boilers ; in air, circulating and feed pumps ; in forced-draught blowers ; the adoption of oil for fuel in place of coal, and the development of a method for the more accurate design of propellers for the conditions under which they have to operate.

Upon the author assuming his duties in the Bureau of Steam Engineering in July, 1906, of the various vessels under construction there were only five whose machinery plants have had any influence upon design during the period of development of subsequent years. These five vessels were—

Battleships *Michigan* and *South Carolina*.

Scouts—*Birmingham*, *Chester* and *Salem*.

The two battleships, aside from their interest as the forerunners of the Dreadnought and super-Dreadnought classes of vessel, were of interest from an engineering point of view on account of having the first examples of perfected reciprocating engines for main propelling engines, and on account of being the first vessels in the Navy to be originally built with superheaters applied to the boilers.

The scouts were particularly interesting, as two of them carried the first installations of turbine-propelling machinery that existed in our Navy, the *Chester* being fitted with a four-shaft arrangement of the Parsons reaction turbines, while the *Salem* had a two-shaft arrangement of what is known as the Curtis velocity-compounded impulse turbines. The third vessel, the *Birmingham*, was fitted with high-speed reciprocating engines in order to give a thorough comparison of the three systems.

Valuable lessons were taught by both battleships and scouts The lessons were as follows :—

Lessons Learned from "Michigan" and "South Carolina."

Engines.—The engines of these ships were fitted with piston valves of such length that the steam ports were perfectly straight and entered the steam cylinders in the plane of the diameter. This change from the old system, in which the valves were short and the steam passages long and crooked, permitted the use of ports of larger cross-sectional area resulting in a decrease in steam velocity through the ports with consequent reduction in steam-pressure drop between the valve chest and cylinder, while at the same time a very considerable reduction in the volume of the ports, and, consequently, in the total clearance volumes was realised. The clearance percentages of the old type of engine, referred to the volumes swept out by the different steam pistons averaged about

H.P. cylinder	22½ per cent.
I.P. ,, ...	18½ ,,
L.P. cylinders	16 ,,

With these first engines of the new type these clearances were reduced to

H.P. cylinder	12½ per cent.
I.P. ,, ...	12 ,,
L.P. cylinders	11½ ,,

* Abstract of paper read before the American Society of Naval Engineers by Captain C. W. Dyson, U.S. Navy (Member , and published in the *Journal* of the Society for May, 1917.

Again, in the old type of engine the cylinder ratios, neglecting clearances, were

$\frac{\text{I.P.}}{\text{H.P.}}$	2·68	say $2\frac{3}{4}$.
$\frac{\text{L.P.}}{\text{I.P.}}$	2·65	say $2\frac{3}{8}$.
$\frac{\text{L.P.}}{\text{H.P.}}$	7·046	say 7.

These ratios gave an expansion of the steam of about 9, and while such ratios of cylinders tend to light weight, they also produce low economy at full power on account of the low ratio of expansion.

In order to increase the economy of the engines, the cylinder ratios of the *Michigan* and *South Carolina* were made

$\frac{\text{I.P.}}{\text{H.P.}}$	2·64	say $2\frac{3}{4}$.
$\frac{\text{L.P.}}{\text{I.P.}}$	3·85	say $3\frac{7}{8}$.
$\frac{\text{L.P.}}{\text{H.P.}}$	10·13	say 10.

This change in ratios increased the expansion of the steam to about 12, and reduced the mean effective pressure as referred to the L.P. cylinder from about 55 pounds to 35 pounds per sq. in. of L.P. piston area.

As previously stated the boilers of these vessels were fitted with superheaters. The original estimate of the amount of superheat which could be realised from the amount of surface provided was about 100° Fahr., but on trial the superheat at the H.P. valve chest only reached 86 deg. As the percentage gain in economy by the use of superheat is roughly estimated at 1 per cent. for every 10 deg., the superheat gave a gain of 8·6 per cent. in economy.

The actual gain in economy of the engines of these vessels was, however, considerably in excess of this, although the exact amount is not known, the water consumption of the engines not having been measured. The fuel measurements, however, showed a coal consumption of 1·46 pounds per hour per horse-power of all machinery in operation, which, when compared with 1·775 pounds, that of the *New Hampshire*, one of the last of the vessels having the old type of engine and no superheat, indicates a total gain of $21\frac{1}{2}$ per cent. The difference between 21·5 and 8·6, 12·9 per cent., is a rough measure of the gain due to the changes in the engine proportions and design. This gain will later be shown to have actually occurred, as in later engines the water consumption was actually measured.

Other Points of Interest.

In laying out the main steam piping of the *Michigan* an attempt was made to eliminate all slip joints by the use of generous bends in the pipes and thus rid ourselves of the trouble due to leaks from such joints. The results obtained were very unsatisfactory, as steel piping of the diameters used, 7 to 12 ins., was too stiff to expand freely with the amount of bend that could be installed. It was found impossible to keep the flange joints tight, and the entire system had to be replaced by piping fitted with slip joints.

A departure in the material for the main feed system was also made. In previous ships the feed piping had been of seamless-drawn copper throughout. On the *Michigan* all feed piping of 5 ins. diameter and over was made of seamless-drawn steel.

Forced-draught blowers.—In regard to these, the two battleships also marked the beginning of an epoch; while preceding vessels had all been fitted with blowers of large diameter and slow speed of revolution, driven by reciprocating engines, on these new ships blowers of a type known as the Sirocco were installed, and these were driven by electric motors obtaining their current from the ship's electric plant. While the old-type fans were run at only about 225 revolutions, the new type ran at about 650, resulting in much smaller, lighter machines, and by the replacement of the reciprocating engines by electric motors, vastly increasing the durability and the reliability of the system.

The Scouts.

These vessels, *Birmingham*, *Chester* and *Salem*, are chiefly interesting as marking the definite abandonment of the reciprocating engine for light, high-speed work and the adoption of the turbine in its place, the reciprocating engines of the *Birmingham* having been fitted for the purpose of obtaining a comparison of the economy and reliability of the two types of machinery.

The engines of the *Birmingham* ran at 200 revolutions, those of the *Salem*, which vessel was fitted with Curtis turbines, at 350 revolutions, and those of the *Chester* at 502 revolutions, the engines developing 16,000 i.h.p. for the *Birmingham* and 16,000 s.h.p. for each of the other two vessels, the steam pressure being 250 pounds per sq. in. gauge.

While the *Chester* was the first example of Parsons turbines in our Navy, this type of turbine had been so thoroughly developed in all its details before being pushed forward as a competitor of the steam engine that the installation fitted to the *Chester* was similar in its arrangements and mechanical details to all subsequent vessels in which this type of turbine was installed. The turbines were arranged on four shafts, with an H.P. on one and an I.P cruising turbine on the other of the two inner shafts. While later vessels with four-shaft arrangements were fitted with astern turbines on all shafts, the *Chester* differed, and astern turbines were fitted to the inner shafts only.

The *Chester* was a successful ship from the outset, as was the *Birmingham*, and both vessels reflected credit upon their builders.

The experience with the *Salem*, however, was far from satisfactory, and the reasons are not difficult to find. In tracing them out it will be well to give a short sketch of the progress of the Curtis turbine up to the date of completion of the *Salem*.

The Curtis turbine is of the type known as "impulse velocity-compounded." It has been used quite extensively on shore for driving electric generators before the marine type was designed. The type used on shore being built as vertical units, it became necessary to depart from this form to adapt the turbine for use on board ship.

At this early date the theory of this turbine carried with it the idea that as all expansion of the steam took place in the steam nozzles, wherein steam pressure was changed into velocity, there was no change in pressure throughout the blades of any one stage, and that therefore there was no unbalanced steam thrust on the rotor of the turbine.

The earliest marine application of the Curtis turbine occurred on the yacht *Revolution* in about 1902. These turbines were provided with only two stages, and developed shaft horse-power equivalent to 1,800 i.h.p. at 672 revolutions. A Board of Naval Engineers reporting on the performance of these turbines in 1903, stated, "This plant, being the first large set of steam turbines installed for screw propulsion in the United States, it seems appropriate to mention that the general performance of these turbines, although themselves built rather in the nature of experimental appliances, was quite satisfactory, and they are well adapted as a type of motor for the transmission of propulsive power." . . . "The points in conjecture with regard to these machines being their efficiency and their capacity to compete in economy with the best marine engines, should be ascertained by more accurate tests, both on land and on board ship, where this is possible. The opinion of the undersigned (the Board) is that such tests are warranted, and eventually will result in the application of a motor for screw propulsion highly satisfactory to the naval service."

Following this report the Southern Pacific S.S. Co. placed an order with the Fore River Shipbuilding Company for the construction of the S.S. *Creole* to be fitted with Curtis turbines, and in 1905 the Navy Department contracted with the same Company for the construction of the *Birmingham* and *Salem*.

The turbines of the *Creole* and *Salem* were made practically from the same patterns, the nozzle areas of the *Salem* being, however,

twice as great as those of the *Creole* on account of being called upon to deliver twice the power. The turbines were built with seven-wheel stages, the drum type of Curtis turbine not having yet appeared upon the scene.

The turbines of both these vessels were fitted with a type of blading which "hind sight" has taught us was so weak as to be a serious menace to the reliability. The diaphragms between stages were made each in one piece, and to overhaul the shaft packing of any diaphragm required that the turbine shaft be completely stripped up to and including the desired diaphragm. Further, the thrust bearings were made completely independent of the turbine casings, which was a serious mistake, as these bearings should come and go with the turbine as it expands or contracts. Also, in the case of the *Salem*, while the turbines of the *Creole* were made rights and lefts, those of the *Salem* were made rights only, the port turbine being exactly the same as the starboard, but being turned end for end when installed in the ship. This resulted in adding the unbalanced axial thrust of the turbine to the propeller thrust and unduly overloaded the thrust bearing and its support, and has been a continual source of trouble ever since the vessel went into service.

A comparison of the machinery weights of the three scouts will be interesting, both actual weights and weights per actual power developed on trial.

The total weight of machinery installation, including propelling machinery, auxiliary machinery, piping, boilers and fittings, smoke pipes and uptakes, lagging and clothing, flooring, ladders and gratings, fittings and gear, stores, tools and spare parts carried on board, and pipes, valves, &c., connected to machinery not under cognisance of the Bureau of Steam Engineering was—

	Dry.	Wet.
For *Birmingham*	760·82 tons	843·97 tons
Salem	853·85 tons	908·96 tons
Chester	735·87 tons	800·69 tons

The weight per horse-power delivered was :—

		Pounds.
For *Birmingham*	(I.H.P.)	117·18
Salem	(S.H.P.)	112·68
Chester	(S.H.P.)	89·67

Turning now to the question of relative efficiencies of propulsion, and reducing the indicated horse-power of the *Birmingham* to shaft horse-power by multiplying by 0·92, the shaft horse-power per knot speed per hour required were as follows :—

Knots	10	15	20	24	25
Birmingham	92	156	331	563·5	—
Salem	97·5	193	380	600	710
Chester	80·2	190	362·5	604	758

These power results are not particularly consistent, due, probably, to the characteristics of the hulls of the vessels and to variations in weather conditions under which the trials were held. There may also have been errors in the torsion-meter readings, especially at the low speeds, where a slight error would produce the greatest percentage error.

Now, the true measure of efficiency of propulsion is not horse-power required for any speed, but is either steam consumption or fuel consumption required to produce the speed. Where oil fuel is used the personal element of the operating force is reduced to a minimum, and measurements of fuel are preferable to measurements of steam consumption, as the first gives a gauge on the efficiency of the entire machinery plant, including boilers, while the latter gauges the efficiency of the engines and auxiliary machinery only. Where coal is used as the fuel the personal equation of the fire-room force enters largely into the problem, and therefore measurements of steam consumption are to be preferred in such cases.

The steam consumptions in pounds per hour of the three vessels, for all purposes, on these trials were as follows :—

Knots ...	10	15	20	24	24·5
Birmingham ...	34,000	66,000	134,000	285,500	—
Salem	44,000	84,000	150,000	273,000	300,000
Chester	43,200	76,500	138,500	254,800	284,000

The steam consumptions of the main engines only, at these speeds were :

Knots ...	10	15	20	24	25·7
Birmingham ...	21,000	50,400	113,400	247,000	—
Salem	29,300	68,700	127,300	248,000	261,500
Chester ...	24,250	56,200	118,000	248,000	244,000

Pounds of water per hour per shaft horse-power (main engines only) :—

Knots	10	15	20	24	24·5
Birmingham	22·82	21·56	17·06	18·26	—
Salem	33·27	23	16·8	16·50	14·75
Chester	30·34	19·72	16·27	15·93	13·31

Attention is called to the fact that while the total steam consumption with reciprocating engines is decidedly better below about 22 knots than that of either the Curtis or the Parsons turbines, even though the latter are fitted with cruising turbines which are in use from 20 knots down, the economies are about even at 22 knots, and above that speed both types of turbines have a decided superiority. Hence, in cases where high speed and light weight were the prime factors to consider in the design of machinery for a vessel, some type of turbine machinery was always to be preferred over reciprocating engines. In cases where the speed of vessel was comparatively low, where high speed was seldom called for and where economy of propulsion at cruising speeds was of paramount value, the reciprocating engine was, under the conditions of turbine design existing at this early date, very much to be preferred.

For several years after the adoption of turbines as a prime mover for marine propulsion the turbine designers and builders successfully blinded the public concerning the performances of turbine vessels by comparing the steam per horse-power required by turbines with that required by reciprocating engines, and, as shown by the comparison of these amounts for the scouts, the argument was a very good one if the material data necessary to reduce the figures to figures of pounds of water per knot run were not available.

Leaving these vessels we now reach the starting point of what may be called the modern Navy.

1906-1907.

During the summer of this year work was begun on the plans of our first two Dreadnoughts and for two, afterwards increased to five, high-speed destroyers.

The plans for the Dreadnought were prepared in competition with outside firms, and, while a nominal speed of 20 knots was provided in the design, sufficient reserve power was installed to insure of 21 knots being attained.

When the competitive plans were examined by the Department those prepared by the Department were adopted and work on the contract plans and specifications at once started.

The machinery space provided in these vessels was such that only reciprocating engines or turbines of the impulse or impulse-velocity compounded type, similar to those of the *Salem*, could be installed. The Department plans showed reciprocating engines designed on the same lines as those of the *Michigan* and *South Carolina*, the cylinder diameters as designed being 36, 57 and two of 76 in. with a stroke of 4 ft. The contractors, fearing a lack of power in these engines, later increased the diameter of the high-pressure cylinders to 38½ in., a change which was unnecessary for a speed of 21 knots, but which resulted in considerably higher speed of ship.

The plans also showed Babcock & Wilcox boilers fitted with superheaters, the superheating surface being 10 per cent. of the total heating surface. While in earlier vessels, in designing the boiler installations the empirical rule used had been 15 i.h.p. per square foot of grate surface and a ratio of 44·5 to 1 between heating and grate surface, in the design of these vessels the allowance was 18 i.h.p. per square foot of grate and a ratio of 44·5 to 1 between total heating surface, including superheaters, and the grate.

These Dreadnoughts also marked our first step into the field of oil-fuel burning. When it was decided to fit these vessels with oil fuel the best system to adopt was not known. The entire field of

oil burning was carefully gone over and it was determined to fit them with that system which would require the fewest number of changes from the ordinary coal-burning installations, especially as in the case in view, coal was to remain the principal fuel, the oil only being fitted as an auxiliary to be used when coal became difficult to trim or in emergencies. This requirement made it necessary to adopt a system with which the forced-draught blowers required by the coal-burning installation could be used, and we were therefore driven to the now well-known system of "mechanical atomisation" as it is called, although "pressure atomisation" would more exactly define it.

In the arrangement of furnaces for burning either coal or oil the grates are fitted as for ordinary coal-burning boilers, and the burners for oil, with the necessary slotted cones for the proper admission of air, are located between the furnace doors. Owing to the limited volume of the furnace between the tube roof of the furnace and the grates, only very limited quantities of oil can be successfully burned in such installations. The whole question of oil burning will, however, be discussed more fully later on.

(To be continued.)

STATE ENCOURAGEMENT OF SHIPBUILDING IN ITALY.

The *Gazzetta Ufficiale* (Rome) recently published a Decree designed to facilitate the construction and equipment of Italian vessels. In substance the Decree is as follows:—

Article 1 provides that wooden ships of over 100 tons in weight and built within the last fifteen years, whether provided with auxiliary motors or not, which are acquired from abroad for the national mercantile marine within a period of two years from the date of the Decree, are to be entitled during the first three years of their service to the exemptions from fiscal dues and war taxation already accorded to cargo vessels by Article 1 of the Decree of 10 August, 1916. During the same period these vessels will also be exempt from any new taxation imposed. The exemptions will, however, only be granted provided the ships are put into use before June 30, 1918.

In Article 2 provision is made for the importation free of all customs duties of the necessary materials for the building and equipment of such ships in course of construction in the national dockyards at the date of publication of the present Decree. In Article 3 similar exemption from customs duties is granted during the period of the war in respect of materials, motors, boilers, and auxiliary apparatus imported for wooden vessels put into construction in the national dockyards after the publication of the present Decree. Under certain conditions, ships not yet completed will also be entitled to the exemption from internal taxation accorded by Article 1.

For the construction in the State of motor and auxiliary apparatus, the bounties provided for by the Law of July 13, 1911, remain in force, but with certain modifications in the amounts which are shown in the Decree.

Vessels with metal hulls and apparatus for their construction are granted the same privileges as those accorded to cargo vessels by the Decree of August 10.

Vessels of not less than 1,000 tons in weight which, after the date of the present Decree, are fitted with mechanical motors capable of supplying a speed of five miles per hour are to enjoy the above-mentioned exemptions from fiscal dues, and motors may also be imported free of import duty.

Articles 6 and 8 of the Decree of August 10, 1916, regarding freedom from Government requisition and the ownership of vessels, are to apply to the ships dealt with in the present Decree.

The above-mentioned issue of the *Gazzetta Ufficiale*, containing the text of the Decree, may be consulted by British firms interested at the Department of Commercial Intelligence, 73, Basinghall Street, London, E.C. 2.

THE FIRST MOTOR SHIPS BURNING CRUDE OIL.

In the year 1915 the Norwegian firm of Hannevig ordered from the Baltimore Dry Docks & Shipbuilding Company four medium-sized tank vessels to be fitted with crude oil motors. Whereas ignition is accomplished solely by compression in the Diesel motor, a hot head or plate is needed by the heavy fuel used in a crude-oil motor. The contract price for each of the Hannevig vessels was about £100,000. Early in 1916 one vessel was sold to the Vacuum Oil Company (New York) for £160,000; and towards the end of the year two others were sold to the Pierce Oil Company for £260,000. Only the fourth vessel was kept by the Norwegian firm. The first vessel, the *Bramell Point* (Vacuum Oil Company), made her maiden voyage to Europe last December; the *Pennant* went to East Asia in January and the *Ralph Bulawa* went to Asia in February. The fourth vessel, the *Clement Smith*, was delivered in March. All the vessels are of the Isherwood type, 303 ft. by 47 ft. by 31¼ ft., and of 5,080 tons at 31¼ ft. draught. About 480 tons of fuel is carried in the double bottom. The trial speed (laden) was 9 knots, each of the three screws being driven by a 550-h.p. Swedish Bolinder motor, with four cylinders (10¼ in. diam. by 29 in. stroke), running at 160 r.p.m. These are by far the largest hot-bulb motors yet built and tested. They are somewhat cheaper and considerably simpler in construction and operation than Diesel motors of equal power, and their performance during the maiden voyages was thoroughly satisfactory. The fuel consumption is about 0·55 lb., compared with 0·33 lb. per horse-power hour for Diesel motors. The crude oil motors share with Diesel motors the same advantages over steam engines in respect of saving in weight and space occupied.

DEVELOPMENT OF THE SWEDISH LLOYD.

Like the "Transatlantic" concern, the Swedish Lloyd bids fair to develop into a very large undertaking. One peculiarity of the Lloyd is the small size of its vessels. Only one of the 42 steamships at present at its disposal is of considerably above 3,000 tons capacity. The Lloyd owns all the shares in the Svithiod, Thule and Goteborg-Manchester firms and disposes of their fleets. The total tonnage of the 42 vessels in the fleet is 84,028 tons d.w. capacity (average, 2,000 tons), compared with 32 vessels and 45,000 tons for the four owners in 1913. There are eight steamships under construction (22,200 tons total), which will all be delivered by the summer of 1919. The Lloyd proposes to buy vessels whenever an opportunity arises. In 1916 it bought four steamships, and will thus control over 110,000 tons by the end of the year. The capital has risen by leaps and bounds. In 1914 it was £107,500. In 1916 it was increased first to £215,000 and soon afterwards to £323,000. Not long ago, shareholders received (out of the 1916 profits) one new share in respect of each three old ones, and in addition £107,500 of new shares were issued at par, so that the capital now amounts to £539,000. The nominal capital of the Thule Svithiod and Goteborg-Manchester firms, whose shares are owned by the Lloyd, amounts to £192,000. In the various funds of the Lloyd over £220,000 is available. The company's vessels are to be used in regular traffic with all Mediterranean countries and with French and British ports. For the insurance of its vessels, the Lloyd founded its own insurance company (Elfsborg) last year, when also it acquired a Goteborg repair yard and already employs 100 men therein. The rapid growth of so large and wealthy a concern in Sweden is one of the fruits of the war.

Institute of Metals.—The Council of the Institute of Metals announce that an extra election of members will take place on July 18. Those desirous of applying for membership of the institute are invited to write to the Secretary of the institute, 36, Victoria Street, Westminster, S.W. 1, for a copy of the new membership booklet, comprising 88 pages, which includes an up-to-date list of the institute's 760 members.

STEAMSHIP APPLIANCES.

AN AUTOMATIC EMERGENCY LIGHTING AND WIRELESS INSTALLATION.

The Merchant Shipping Act of 1914 lays it down that "every ship fitted with a radiotelegraph installation shall be provided with an emergency installation, every part of which is placed in a position of the greatest possible safety. In all cases the emergency installation must be placed, in its entirety, in the upper part of the ship, as high as practically possible. The emergency installation includes, as provided by Article XI of the regulations annexed to the International Radiotelegraph Convention, 1912, an independent source of energy capable of being put into operation rapidly, and of working for at least six hours with a minimum range of 80 sea miles for ships in the first class and 50 sea miles for ships in the other two classes."

Although the Act quoted above was passed just before the outbreak of war, that is before the risks to merchant ships were increased

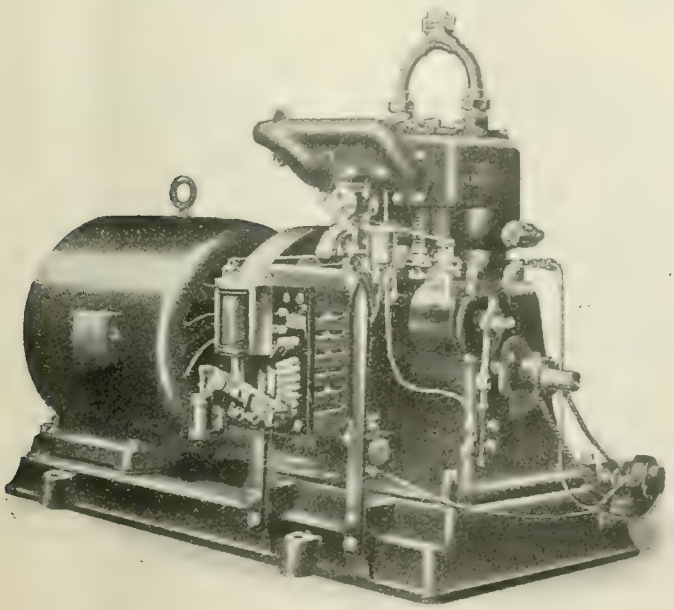


Fig. 1.—Engine and Dynamo of Lister-Bruston Automatic Emergency Set.

a thousandfold by the menace of mine and submarine, it was realised that there was always a possibility of a ship foundering at sea as a result of collision with another vessel, sunken rocks or icebergs, and that in nearly every instance and no matter from what cause, there is a liability of the stokehold or engine room becoming flooded, in which case the dynamo is stopped, and as a consequence the ship is plunged into darkness and the wireless installation ceases to operate.

To prevent this the Act has made it compulsory for all ships to do what many large passenger ships had already done voluntarily, that is to carry an emergency dynamo in such a situation that it could be utilised to supply power for lighting purposes and for the wireless installation long after the main generator had been put out of action. This emergency generator is therefore usually situated on the upper deck. Driven by a small petrol or oil engine, it is independent of the steam from the boilers, and provided it is kept in thorough working order it should be possible to start it up very soon after the need for it has become apparent.

But there are two weak features in this arrangement. Firstly, the engineer whose duty it is to start up the emergency set may not be available owing to his having become incapacitated as a result of the accident which renders the employment of the emergency set necessary; and secondly, owing to the fact that the engine driving the emergency set has not been running for some time, just at the particular moment when it is required it is difficult to start up, with the result—which has occurred in many actual instances—that from 20 to 30 minutes are occupied in starting up the engine, by which time it may have ceased to be of any assistance to the ship.

To obviate the two difficulties mentioned, it is essential in the first place that the control of the emergency set shall be absolutely automatic, so that no sooner does the usual supply of electricity fail, and from no matter what cause, than the emergency set starts up

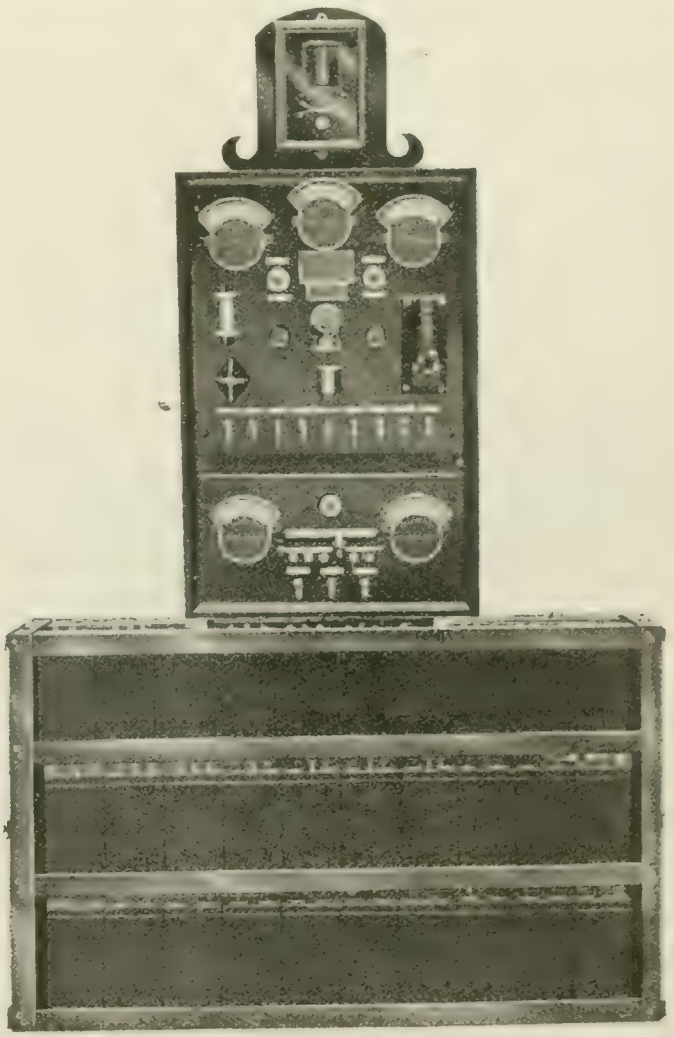


Fig. 2.—View of Switchboard with Battery Underneath.

and supplies power to the most essential circuits, such as navigation lights, bridge, chart house, engine room, and last, but by no means least, to the wireless room. In the second place it is essential that the whole of the emergency installation shall be in such efficient running order that it shall be always ready to start up, no matter how infrequently it is used in an emergency capacity, and the only way to ensure this is to have an arrangement whereby the machinery is run periodically—preferably every day—for a short while, and under capable supervision, so that any defects which have a tendency to develop may be made good, thus ensuring that the installation shall be in perfect running order whenever it may be required.

Although there are not many types of emergency sets on the market which fulfil these two essential conditions, the Lister-Bruston Automatic Emergency Lighting and Wireless Installation

—which we had the pleasure of seeing in operation recently—may fairly claim to do so.

The plant is made in various sizes from 1 up to 30 k.w. capacity, and consists essentially of a dynamo direct coupled to a two-cylinder petrol engine as shown in Fig. 1, together with a storage battery which is usually stowed away under the switchboard as shown in Fig. 2. The main control is carried out by means of a differential relay—shown in the centre of the switchboard—upon the core of which are two solenoids wound one upon the other, one of which is connected with the ship's mains and therefore supplied with current from the main generator, whilst the other is connected with the secondary battery, the strength of the first solenoid being slightly greater than that of the second. The plunger working in the solenoids is so arranged that under normal circumstances it keeps the battery circuit open. If, however, the main current fails from any cause whatever, the plunger moves under the influence of the battery solenoid operating a switch which connects the emergency dynamo to the battery in such a way that it runs as a motor, thus starting up the petrol engine which, as its speed increases, ultimately generates in the dynamo a higher voltage than that of the battery which is thus cut out, leaving the dynamo to take the emergency load. This it continues to do until the main supply is resumed, when the engine is automatically stopped by the action of the main coil in the solenoid. It should be noticed that the time taken from the failure of the main supply to the operation at full working pressure of the emergency generator is only about half-a-minute.

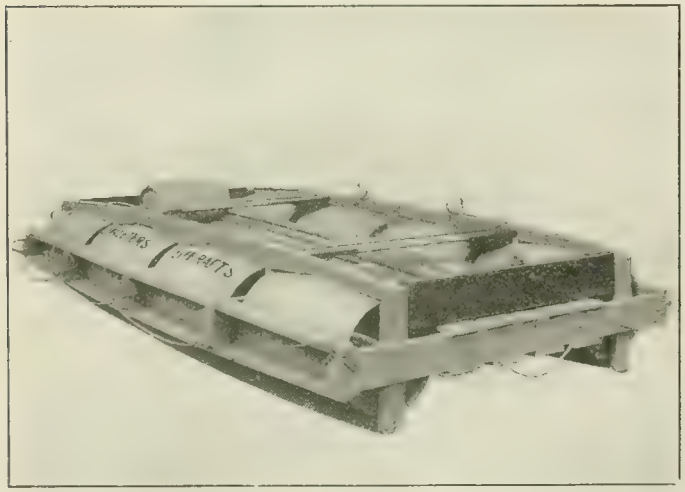
In order to ensure that the installation shall always be in working order a time switch is connected to the differential relay, by means of which the whole plant is tested at a certain time every 24 hours, and allowed to run for a given period—usually about half-an-hour—during which time the current generated by the dynamo is utilised to charge the battery, thus keeping it fully charged, and therefore ready for any emergency which may arise. This time switch is shown just above the relay in Fig. 2, and is provided with an arrangement whereby the time of automatic starting up and the duration of the daily test run may be varied at will. In order that this daily test shall not be neglected, if for any reason whatever the set does not start up at the appointed time—due, say, to shortage of petrol in the engine tank—a pilot lamp is lighted, and remains alight until the plant has been put into working order again, this lamp being situated in the chief engineer's cabin, the chart room or some other predetermined position.

It will thus be realised that the Lister-Bruston Automatic Emergency Lighting and Wireless Installation can claim to fulfil the two essential conditions stated above, which must be fulfilled in an emergency set such as is demanded by the Merchant Shipping Act of 1914, since it is both automatic and reliable; and in view of the fact that many ships have already had emergency sets installed which cannot claim to be automatic in their action, it is of interest to know that in many instances the existing plant may readily be converted to the "Lister-Bruston" system of control.

LINKLETERS' WELL-DECKED NAVIGABLE LIFE RAFTS.

The question of efficient life-saving appliances on vessels keeping the seas at the present time is one of particular interest, and the advantages of properly designed life rafts are now being more fully recognised than ever before.

Life rafts at one time were thought too costly to receive full consideration for the ordinary merchant vessel, and it is to meet the present demand for additional life-saving appliances on all classes of vessels that these well-decked navigable life rafts are being introduced, which can be supplied at such low cost that even the smallest merchant steamers might be provided with them.



Linkleters' Navigable Life Raft.

Navigable Life Raft in Use.

These rafts are made in two different sizes:—12 ft. × 7 ft. 2 in. × 2 ft. 5 in., having eight distinct barrel air cases; and 9 ft. × 6 ft. 2 in. × 2 ft. 5 in., having six distinct barrel air cases.

They are equipped with oars, rowlocks, thwarts, end-boards, provision tank, water beaker, and are navigable either side up, the gear being so stowed that it is obtainable for use on which ever side is uppermost. The provision tank, which is fitted between decks amidships, is provided with a screw-capped handhole in top and bottom, so that access can be made from either side of the raft.

They have ample buoyancy and stability, and will support as many persons as can be got on and around the construction. Briefly, they combine the life-saving qualities of the lifebuoy float with the handiness and navigability of a lifeboat.

Although of very strong construction they are comparatively light and handy, and can be thrown into the water from a vessel's deck.

Special attention is directed to the following advantages:—It is as handy as any boat to manœuvre under oars or sail, and of stronger construction; safer than any boat under all circumstances; is workable under conditions where boats would be useless, such as alongside a vessel in a seaway, or tracking ashore over rocks; no expensive davits required, and can be launched over the rail from any vessel's deck.

The weight complete is about 8½ to 9 cwt.

GENERAL NEWS SECTION.

PERSONAL.

Lieutenant T. T. Laurenson is another Cardiff Master Mariner who has received the Naval Distinguished Service Cross. He is now in the Royal Naval Reserve.

Sir John Gunn, of the firm of J. & M. Gunn, shipowners, Cardiff, has endowed a new department to deal with orthopædic cases at the King Edward VII's Hospital, Cardiff.

In our issue of July 5 we briefly referred to Mr. Henry Mullineux Grayson, principal of the shipbuilding firm of H. & C. Grayson, Ltd., and Director of Ship Repairing to the Admiralty, who, as stated, has been adopted as prospective Conservative candidate to contest one of the two Parliamentary Divisions of Birkenhead at the next election. We are now enabled to give a reproduction of his photograph.

Mr. Henry Mullineux Grayson,

Director of Ship-Repairing to the Admiralty.

Mr. J. Liddle Cheyne, Accountant to the Alexandra (Newport & South Wales) Docks and Railway Company, has been appointed Secretary in the place of Mr. Walter G. Flanders who has resigned.

The Distinguished Service Cross for Mine-Sweeping Services has been awarded to Lieut. Eric Rees, R.N.R., who, prior to the war, was second officer on board the Cunard Company's steamer *Pannonia*.

Captain Antonio Candina, Master of the Spanish steamship *Mar Cantábrico*, of Bilbao, has been awarded a piece of plate by the Board of Trade, in recognition of his services to a shipwrecked British crew, which he rescued on May 10.

Mr. A. M. Crawford, formerly with the Laird Line, Ltd., Glasgow, has been appointed manager of the Aberdeen, Newcastle & Hull Steam Company, Ltd., in succession to Mr. Cowper, who has been appointed manager at Dundee, of the Dundee, Perth & London Shipping Company.

Sir Edward Nicholl, shipowner, Cardiff, has offered to build a home in connection with the Church of England Waifs and Strays Society, at a cost of £20,000, provided a freehold site is secured and an endowment fund raised. Lord Tredegar has promised the site required, and £700 has been secured towards endowment.

At the fortnightly meeting of the Belfast Harbour Commissioners last week, Mr. Richard Beamish Fair was unanimously co-opted a member of the board in place of Mr. John Andrews, resigned. Mr. Fair has for many years occupied a leading position in the corn trade of the city, and has manifested a wide interest and intimate knowledge of shipping matters generally.

Captain Wm. Boultbee Whall, R.N., who died recently at Thurning, Barry, at 71 years of age, was for many years principal officer of the Board of Trade at Cardiff and Barry. He was a Master of Trinity House, and had held important commands in connection with the British Mercantile Marine, and was the author of several works on nautical subjects.

Mr. Robert Crawford, C.E., Greenock Harbour Trust engineer, has just completed 50 years' service with the Trust. After acting as assistant he was appointed engineer in 1888. Some of the most important of the Greenock harbour works, including the Albert Harbour, Prince's Pier, the Garvel Graving Dock, and the James Watt Dock have been constructed during Mr. Crawford's period of service.

Mr. Frederick Witty, whose death occurred at Barcelona, Spain, on June 25, in his 73rd year, was the Founder and Senior Partner of F. Witty & Co., shipbrokers and general commission agents. He had lived in Spain for 45 years, and was British Vice-Consul at Barcelona for 25 years, acting Consul at various times. He was one of the founders of the British Chamber of Commerce for Spain, and took a keen interest in the local Seamen's Institute.

REWARDS FOR DESTROYING SUBMARINES.

The following letter from Sir Thomas Devitt, Bart., appeared in *The Times* of July 7 :—

SIR,—There is a widespread feeling that the bravery and patriotism of our merchant service is not sufficiently appreciated by the general public. The Admiralty have recently offered awards to British merchant ships for successful action in self-defence against enemy submarines and warships, providing for the payment of an amount not exceeding £1,000 for the capture or destruction of any enemy submarine or other ship of war. It may interest your readers to know that I have received the sum of £20,000 and have been asked by the donor to administer the same in gifts of £1,000, to be divided between the captain, officers, and crew of any merchant ship flying the British flag which after this date succeeds, in the opinion of the Admiralty, in capturing or destroying an enemy submarine. Applications for this reward should be made through the owners to the chairman of Lloyd's Register of Shipping, 71, Fenchurch Street, London, E.C. 3.

Yours obediently,

THOS. L. DEVITT.

DUTCH SHIPBUILDING PROSPECTS.

According to Dutch shipping journals, there are ocean-going vessels, totalling about 400,000 tons, at present under construction in Holland. The great difficulty by which the builders are faced is the scarcity of iron, supplies of which have to be obtained exclusively from abroad. The difficulty is accentuated by the fact that yards which are normally occupied in the construction of dredgers and harbour vessels, &c., have taken up the construction of sea-going vessels, partly owing to the high price of the latter, partly owing to stagnation in their normal markets. The scarcity of materials is thus rendered more acute. It is feared that, since the requisite materials will not be obtainable at anything like normal prices for a long time after the war, construction of Rhine ships and other vessels for inland waterways will be much restricted or, at any rate, show much reduced profits. Before the war, Dutch yards were able to build such vessels a great deal more cheaply than German yards.

As regards ships' engines, prospects are bright for oil motors, which were already used extensively in Dutch inland shipping before the war. The construction of steam turbines has been taken up by large Dutch yards and engine builders, and special attention is being paid to the production of high quality machines, taking the best Swiss types as models. Dutch marine turbines are a factor to be reckoned with in future.

FROM OUR CORRESPONDENTS.

CLYDE AND DISTRICT.

(From Our Own Correspondent.)

Glasgow.

It is understood that A. & J. Inglis, Pointhouse Shipyard, contemplate carrying out certain alterations and improvements on their yard. The scheme includes the improving of the launching ways of certain building berths, and for this purpose it may be necessary to lease additional ground adjoining the Pointhouse yard.

Clyde Shipyard Holidays.

The shipyards, engineering works, and other establishments in the Glasgow district will be closed to-day (Thursday) for the annual holiday period which usually extends over ten days. In the first year of the war the Government cancelled the holidays, and in the second year they were postponed. On both occasions the action of the authorities gave rise to a great deal of dissatisfaction among the workers. This year, however, the Government intimated a month or two ago that they did not intend to interfere with the normal holiday arrangements. This means that the yards and workshops will remain closed during the remainder of the present week and all next week, re-opening on Monday, July 23. The annual holidays in Greenock and Port Glasgow, which are usually held a week earlier than on the upper reaches of the river, began on July 4, and work will be resumed on Monday next. In view of the approaching stoppage of work for the holidays there was great activity in many establishments in order to get vessels completed before work was stopped. A good many steamers have therefore been running trials on the measured mile within the past two or three weeks.

The Clyde Trust's Revenue.

The Clyde Trust's statement of accounts for the year which closed at the end of June last shows that the revenue of the Trust has suffered to some extent on account of the war. The revenue for the year was £659,999, compared with £705,796 in the preceding year. In addition to the ordinary revenue the Trustees received payment from the Admiralty on account of Government ships and stores, in respect of the two preceding years, the sum of £23,401, making the total receipts for the year £683,400. Under present conditions the revenue for the year may be considered satisfactory. The falling-off is due almost entirely to the increased cost of labour and material and the decrease in shipping traffic.

Dockers' Wages Increased.

The shipowners and stevedores at practically all the leading ports in Scotland have granted advances to the dock labourers employed by them. The latest ports to come into line in this respect are Greenock and Dundee. In connection with the Greenock dispute a conference was held in Glasgow last week between representatives of coasting shipping companies at Greenock and officials of the Scottish Union of Dock Labourers. It was arranged that the men should receive an extra 1d. per hour for day and night work. This makes an increase of 4d. per hour since the war began. It was also agreed that 2s. 6d. should be granted to weekly men and to cranemen. In each case the advances came into operation on Friday last. The dockers' wages dispute in Dundee, which was submitted to arbitration, has also been settled. The arbiter grants an advance of 1d. per hour, making the rate for the discharge of jute boats 1s. per hour in summer and 1s. 1d. per hour in winter, and the rate for general cargo boats 11d. per hour. In the case of weekly boats ½d. per hour extra is granted, making the rate 10d. per hour.

THE NORTH-EAST COAST.

(From Our Own Correspondent.)

Newcastle-on-Tyne.

The question of pre-war contracts was the subject of an animated discussion at the last meeting of the Newcastle Chamber of Commerce. A Government Committee, presided over by Lord Buckmaster, is at present considering this important question, and two members of the Tyneside Chamber have given evidence before it. They suggested that all pre-war contracts, particularly those whose period of shipment had expired while the war continued, should be rendered null and void by Act of Parliament. It is estimated that if pre-war contracts are insisted upon, something like nine million pounds sterling will be at stake in Newcastle, and therefore the fulfilment or otherwise of these agreements is a matter of very real concern to the commercial community of the district. The Advisory Committee of the Chamber put forward a recommendation: "That all commercial pre-war contracts be cancelled," but this was regarded by the Council as too wide to carry weight in the proper quarter, and the Committee were requested to draft a comprehensive resolution for submission to the next meeting of the Council. In the subsequent motion it is probable that specific points will be brought out in place of the general proposal just mentioned.

Exigencies of War Time.

Organised labour has frequently chafed under the numerous restrictions imposed upon its freedom as the outcome of the exigencies of war time, but there have been compensations, and some of a very appreciable kind. Excepting in the case of the engineers there have been very few stoppages of work, and in consequence there has been a greatly reduced call upon the funds for dispute benefit. In pre-war days the unskilled and semi-skilled trade unions used to be hard hit by the strikes among skilled men, but since the European conflict began, strikes have been reduced practically to a minimum, and this has been all to the benefit of the trade organisations, large and small. Take, for example, the National Amalgamated Union of Labour, whose headquarters are in Newcastle. In peace times it has spent as much as £10,000 in one year on dispute benefit, whereas in the past twelve months, according to the annual report, just published, the outlay under this head was only £172. During the year a small increase was made in the contributions, and the effect of this, plus the great saving over dispute benefit disbursements, the society is £15,232 better off than it was at the end of the preceding year. The amount of the general funds rose to a total of £41,018, a nice little "nest egg" for an organisation composed very largely of labouring men.

Decimal Coinage and Metric System.

In these days when even the farmers are beginning to see the advantages of a decimalised coinage and the metric system of weights and measures, we cannot feel surprised at commercial men, among whom must be included shipbuilders and shipowners, becoming impatient at the delay there is in reforming our coinage and weights and measures. Everybody who has studied the matter regards our systems in this connection as unnecessarily complicated and out of date, and yet there is little or no progress towards a change. Newcastle Chamber of Commerce is trying what it can do to induce the powers that be to get a "move on." It has unanimously passed a resolution that the decimalisation of the coinage and the adoption of the metric system of weights and measures should be considered by Parliament without delay, and has therefore recommended the Executive Council of the Associated Chambers of Commerce to prepare two Bills to be submitted to the House of Commons. Whether this pebble in the pond of inactivity will lead to awakened interest in an old subject remains to be seen.

West Hartlepool Shoal.

At the last meeting of the Hartlepools Port and Harbour Commissioners it was reported that good progress had been made outside the piers at West Hartlepool, and that the shoal which had caused so much trouble had been removed. The engineer intimated that the latest soundings showed a minimum depth at low water ordinary spring tides of 16¼ ft. in the dredged channel at Hartlepool, and of 10¼ ft. from the pier seaward at West Hartlepool.

Wear Pilots' War Bonus.

The Sunderland Pilotage Board has decided to ask the Board of Trade to approve of the war bonus to Wear pilots being increased to 50 per cent., and to be allowed to charge it to both inward and outward bound vessels. From the pilots' point of view there is, it would seem, reasonable ground for the application. It is stated that at the present time the pilots earn an average, including the war bonus, of £12 2s. 11d. per month. If the war bonus is increased as is desired, the average earnings will be brought up to a little over £4 a week.

Advances of Wages.

The selling price of Cleveland pig iron in the past three months averaged 94s. 4·91d. per ton, as compared with 89s. 8·76d. in the previous quarter. Under the sliding scale blast furnacemen's wages are thus advanced 6 per cent., making them 78 per cent. above the standard. The average selling price of steel plates at Consett does not show any change in the past quarter, and therefore wages are unchanged for the current three months, being

62½ per cent. above the standard. Since August, 1914, the Consett steel workers have received advances equivalent to 47½ per cent.

To-day (Thursday, July 12) the shipyard trade unions will meet the National Committee on Production in London to lay before it a request for an increase in wages of 10s. per week for men and 5s. per week for boys under 18, and an equivalent percentage advance to piece-workers. The application has already been before the Employers' Federation, and was referred to the Committee on Production. The higher cost of living and the necessity of maintaining the efficiency of the workers will form the basic arguments on the men's side. Previous advances in the shipbuilding industry since the war commenced have amounted to 12s. per man per week.

MERSEY SHIPPING AND SHIPBUILDING.

Liverpool.

Government requisitioning of ships and direction of ship movements generally has had a serious effect upon Mersey shipping, coupled, of course, with the serious disturbance of trade by the war on all the ocean highways. The traffic returns just issued by the Mersey Docks and Harbour Board for the year which ended on June 30 show that the total tonnage which entered and left the Mersey represents 28,037,304 tons, compared with 31,359,886 tons in the previous year, 37,961,826 tons for the year ended June 30, 1915, and 38,173,344 tons in the year immediately preceding the outbreak of the war. The figures for the two latter years, while not included in this year's annual return, are, nevertheless, from official records.

The number of vessels paying dock and harbour rates has fallen to 16,747 from 18,742 in the previous year, while for 1915 they were 22,562, and for the pre-war year ending June 30, 1914, 24,756.

The finances of the port have necessarily suffered with this great falling-off in traffic, though much of the loss of revenue in rates and dues has been made good by the port charges having been increased all round about 25 per cent., and the dock rent doubled from 1d. to 2d. per ton per week. Nevertheless, the grand total received from all sources is much below the pre-war level, being £1,525,784 for the year under review, compared with £1,488,777 in the 1916 financial year, £1,684,219 for 1915, and £1,678,606 for the financial year 1914, which was unaffected by the war. These figures show how necessary was the further increase in the rates of 15 per cent. which was authorised in December last and which came into force on January 1 this year.

SEA COOKERY SCHOOL.

Besides the provision of a municipal school for the education and training of marine engineers, the Liverpool Education Committee is about to enter upon an important development of the Sea Cookery School in the vicinity of the Custom House. Government aid has been enlisted in support of this latter enterprise, which will aim at training boys and men in large numbers as ships' cooks and stewards. The marine engineering school is to be opened in September next.

NEW GYMNASIUM.

The ceremony of opening the new gymnasium erected by Mr. Alfred H. Read, shipowner, at a cost of over £3,000, as an addition to the Lancashire and National Sea Training Homes at Liscard, Cheshire, and the unveiling of a tablet recording the gift, was performed on Thursday by Mrs. Booth, wife of Mr. Charles Booth, chairman of the Booth Steamship Company, Ltd. Mr. Read, who was one of the founders of the institution along with Sir Alfred Jones, K.C.M.G., and Sir John Gray Hill, remarked, in thanking Mrs. Booth, that they started the homes with eight boys. Now they had 230, and could do with 230 more if they had the wherewithal to pay for their food and clothing. Mr. Read, it may also be added, takes an active part in the direction of the homes, as he fills the dual offices of chairman of the committee and hon. treasurer.

PRIVILEGES TO MERCANTILE MARINE OFFICERS.

Merchant service officers will welcome the decision of the Government to grant them the same privileges as are accorded to naval and military officers and others serving with the forces who are paid out of money provided by Parliament, that in cases where the total income from all sources does not exceed £300 relief may be claimed from income tax as will reduce the amount of income tax to the rate enforced immediately before the commencement of the present war.

SOUTH WALES NOTES.

(FROM OUR OWN CORRESPONDENT.)

Cardiff.

Mr. E. A. Prosser has been appointed to the position of general manager of the Taff Vale Railway Company. About four months ago Mr. Prosser took over the position of general manager of the Cardiff Railway Company in the place of Colonel Denniss who resigned. He is now in charge of the Rhymney Railway Company, the Taff Vale and Cardiff Railway Companies, and has under his control the Bute, and also the Penarth Docks. The appointment is welcomed by shippers and others who have large business connections at the Cardiff Docks, as it will eventually lead to a closer working and general improvement of the facilities for the accommodation and development of the Docks. The appointment will mean that there will be no overlapping in the operations of the three undertakings. It is stated that Lord Bute has personally taken the greatest interest in the negotiations, believing that the arrangement will mean a great deal to the business interests of Cardiff, especially in regard to the future development of the City. It is thought in commercial circles that the appointment is the forerunner of a fusion of the three companies. Mr. Prosser's biography and photo appeared in *Shipbuilding and Shipping Record* on April 12 last.

OUTWARD COAL FREIGHT RATES IN JUNE.

The following table shows the lowest, highest, and average rates of freight paid in June to representative ports, also the average rate for June last year:—

Port.	1917. Lowest.	1917. Highest.	1917. Average.	1916. Average.
Cardiff to				
Algiers	84/9	140	112/4½	76/3⅞ fr.
Bordeaux	34/-	69/-	46/9¼	47/75 fr.
Barcelona	165/-	174/9	169/10⅛	63/9
Brest	22/	23/	22/8	22/-
Bilbao	105/-	—	105/-	
Caen	23/-	48/-	42/11	24/
Cherbourg	23/6	47/3	27/5½	24/6
Dieppe	23/6	48/9	32/3	24/6
Granville	23/	48/-	41/4½	24/
Gibraltar	87/6	90/-	89/2	37/3
Havre	22/6	45/9	39/3	22/6
Marseilles	58/6	—	58/6	107·75 fr.
Malta	157/6		157/6	80/-
River Plate	108/-	—	108/-	42/6
Santander	100/-	—	100/-	

The above rates show little variation from the rates paid in May. Barcelona at 174s. 9d. compares with 165s. the highest rate paid in May, Bilbao at 105s., as against 87s. 6d; Gibraltar at 90s., against 87s. 6d.; and for Marseilles the rate is unaltered.

RESIGNATION OF MR. AMMAN BEASLEY.

Mr. A. Beasley, the general manager of the Taff Vale Railway Company, has resigned his post under the Company. He has been connected with the undertaking for over a quarter of a century, and he will now occupy a seat on the directorate. Mr. Beasley has been chairman for a long period of the Bristol Channel Dock Owners' Association, and in this connection he took a leading part in the negotiations with the Admiralty concerning the payment of dock dues by vessels under the control of the Government for the purposes of the war. At the recent presentation to Mr. T. P. O'Connor, M.P., who acted as chairman of the Committee carrying through the negotiations, Mr. O'Connor gave public expression to his appreciation of the great services rendered by Mr. Beasley in these negotiations.

COMPULSORY PILOTAGE SUGGESTION.

The United Kingdom Pilots' Association convened a meeting of the Bristol Channel pilots to consider the best means of improving the position of the pilots. Alderman Michael Joyce, M.P. (President of the Association), addressed the meeting on Saturday, when it was decided to approach the Lords Commissioners of the Admiralty with a view to obtaining compulsory pilotage for all foreign vessels bound to or from the Bristol Channel ports.

SWANSEA HARBOUR TRADE RETURNS.

The monthly return of the Swansea Harbour Trustees shows that there was again a decrease in imports and exports in June. Imports last month amounted to 38,059 tons as against 48,965 tons in 1916, and exports totalled 347,716 tons compared with 420,950 tons in the corresponding month last year. The total of imports in the first half of 1917 was 262,159 tons, and in the similar period in 1916, 350,267 tons. Exports in 1917 amounted to 1,671,187 tons, as against 2,409,131 tons in the first six months of 1916.

Interesting Wages Claim.

At Newport, Mon., on Friday, a case was heard in which Alfred Swanson, a fireman employed on a hospital ship, sued the master (Captain R. Sunter) for £45, part wages. Mr. J. Moxon, who appeared on behalf of the Seamen's and Firemen's Union, stated that it was a test case, involving about 50 other men in the ship. The vessel left Sydney in June last year, for any port, the wages to be £11 5s. per month, overtime after eight hours per day to be paid at 1s. 8d. per hour. Mr. L. H. Hornby, on behalf of the owners, stated that the Court had no jurisdiction. The claim, if any, should be made at Sydney. More than £50 in wages was due to the men and that Court could not deal with such a claim. Owing to the shortage of ships the men could not be taken home at present. The Court decided that they had no jurisdiction in the matter.

THE FREIGHT MARKETS.

(From Our Own Correspondents.)

London.

From all directions the demand for tonnage on the Baltic Exchange continues unrestrictedly keen. The East is still pressing for boats, and rates are very firm, while from North America tonnage is being actively inquired for on net form. From the River Plate values are still nominal at the unchanged rate of 145s. from the up-river ports, and 5s. less for down-river loading. Charterers on the North American Atlantic seaboard are willing to pay up to 200s. on net form from the Range to the United Kingdom, while to French Bay ports 220s. is offered, and 330s. to West Italy. For Gulf loading 30s. additional can be obtained. Heavy grain is not worth more than 30s. from the Range to the United Kingdom and oats 5s. less. To the French Bay ports the same rates apply. Coal cargoes are offering from Virginia to the Plate at 125s. and to Rio de Janeiro $30, with tonnage difficult to obtain. There is an opening for sugar from Cuba to France at 250s. The Eastern department of the market is still the strongest feature. Rates are not only maintained, but the tendency is for them to go higher. From Karachi 250s. would be paid on scale basis to the United Kingdom. On deadweight Bombay offers 325s. to the United Kingdom, and up to 450s. to the Mediterranean, while the Madras coast quotes 500s. for kernels to Marseilles. The rice ports offer 500s., Saigon to France, and 480s., Burmah to the United Kingdom. Salt cargoes can be obtained at 22 rupees from Aden to Rangoon, and 50s. Torreviejo to Calcutta. In the Mediterranean section of the market a steady trade continues to be done, Alexandria being worth anything from 105s. to 120s. to the United Kingdom, while from the ore and nitrate ports rates are on the basis of 45s. Huelva to the Mersey, Bilbao to Boulogne, 50 fr.; and Bougie to the Clyde, 50s. The Bay trade indicates 22s. 6d., Bayonne to Bristol Channel, and 20s. Bordeaux to the same destination.

Glasgow.

The Glasgow market remains extremely quiet owing mainly to the fact that tonnage continues far short of requirements. There are, therefore, no new features to report. Outward tonnage was in good demand, and the competition for the few neutral boats available was very keen. Homeward markets were steady, but there again the scarcity of boats deprived the market of any interest. The general cargo rate from America to France remained practically unchanged at about 220s. net terms. In the Eastern trades rice rates from Burmah and Saigon were quoted at about 500s.

Newcastle-on-Tyne.

Excepting for the fixture of an 1,100-ton vessel for Christiania at the very high rate of 195 kr., charters recorded in the local freight market this week have been confined to business for coasting and French Atlantic ports, in which latter direction a good many vessels have been taken up at the fixed rates. Coastwise, London has been done for a small steamer at 17s., but it would be difficult to secure repetition of this rate, for the inquiry is at present very small, and merchants are offering only 13s. For Norwegian, Portuguese, Spanish and unrestricted Mediterranean ports, there is a considerable pressure for tonnage at very high figures, but practically no boats are available. Only a very little tonnage is available for the carriage of coals to France at present and orders are accumulating, as is also the case in the coke market. In order to attract coke carriers for Rouen, the Local Committee notifies that an increase of 1s. per ton in the rate for Rouen, whether for Allied or neutral tonnage, is now permissible. Thus, the maximum rate for Allied tonnrge is 48s. and for neutral tonnage 74s. 3d., with, of course, 5s. extra in the case of vessels of under 300 tons. Rates for all other French destinations remain unaltered so far as their maximum figures are concerned.

Liverpool.

Outward freights are quiet, but there is a good enquiry for coal tonnage at firm rates, though the market is adversely affected by the colliery control regulations. Business done is, however, limited by reason of few offers of tonnage. Time chartering is also slow for the same reason, but rates keep at their best. Charterers are not unwilling to negotiate for three years' trading, with delivery after the war, on basis of 21s. to 22s. In the homeward trades Eastern markets only indicate values. Since ships are unobtainable, though prices are tempting enough, North America is doing a fair business in net charters, which from Northern Range ports are worth 200s. to United Kingdom, 220s. to French Atlantic, with 30s. extra from the Gulf. Several fixtures have been made on this basis, with one from Range to French Mediterranean, a 5,500 ton boat at 200s. with options, August. Grain rates still hold to 30s. from Range to United Kingdom or France, and 35s. Gulf to Italy. River Plate has little movement, though rates hold to 145s. up. river, and 140s. down river, to United Kingdom.

Cardiff and Swansea.

The freight market remains in a very quiet state. While the authorities have been fairly well supplied with tonnage, there has been a shortage for other purposes, and in addition the market remains in an unsettled state, over the recent order of the Coal Controller fixing coal prices. With one exception the fixtures reported have been for French Bay and Channel ports, these were, Caen, fixed three times, at 48s. (neutral); Rouen, 48s. 9d. and 50s. 3d. (neutral); Nantes, 61s. 6d. (neutral); St. Nazaire, 61s. 6d. (neutral). Rouen at 50s. 3d. (neutral) and Nantes, 61s. 6d. (neutral) were done for Newport loading. Oran was reported at 48s. 6d. (allied). Chartering at Swansea was on restricted lines, and the only dealings recorded were for French ports—Caen, 48s. (neutral); Havre, 45s. 9d. (neutral); Honfleur, 24s. (allied); Rouen, 24s. 6d. (allied), 25s. 3d. fuel (allied), and 48s. 9d. (neutral).

THE COAL MARKETS.

(From Our Own Correspondent.)

Generally speaking, the conditions obtaining in the coal trade are quiet, but there is rather more firmness in some directions. At the principal coal exporting ports of the country business has been somewhat restricted by the new scheme of the Coal Controller to regulate prices which came into force on June 28, with directions for the sale of coal. It is considered that the scheme will not operate to stimulate trade, but on the other hand it will have the effect of providing that better prices will be obtained. There are many conditions in the new scheme which require explanation, and pending the better understanding of the matter market transactions are likely to be limited in extent.

The bunker coal trade is decidedly quiet. On the North-East Coast bunker coals of all descriptions are quite plentiful and bests are quoted at round about 25s., while second qualities are worth from 16s. 6d. up to 24s. Special qualities of bunkers are not in large supply, and cannot be obtained for less than 27s., while probably 29s. to 30s. is nearer their value. In South Wales the official figure for best bunker coal is 23s., while for second quality bunkers 21s. 6d. is quoted, but the amount of trade passing is very small.

The North-East Coast coal markets are showing a firmer tone, and there is a disposition to more activity in coal of the best descriptions. This applies particularly to best Blyth steams, though Tyne primes are less sought after, and smalls of both descriptions are not in such active request that supplies appear likely to fail the demand. On the other hand, there is a good demand for both house and gas coals, and nuts are readily absorbed by the strong home requirements.

Approximately quotations may be taken for best Blyth steams at 30s. and smalls 20s. to 21s. 6d.; Tyne primes, 25s. and smalls, 20s. to 21s. 6d.; second quality steams, 25s. to 27s., and smalls 18s. 6d.; unscreened steams, 24s. to 25s.; North Northumberland steams, 28s., and smalls, 20s.; smithies, 29s. to 30s.; nuts, 24s. 6d. to 26s.; gas coals, 23s. 6d. to 26s.; coking coals, 17s. to 25s.; house coal, 28s. 6d. to 30s.; best bunkers, 24s. to 25s.; ordinaries, 16s. 6d. to 24s.; and specials, 26s. 6d. to 30s.; foundry coke, 42s. 6d.; and blast furnace coke, 28s.

On the South Wales coal markets business is very slack, and there

is very little inclination to do any trade at all. The chief cause of this condition of inaction is the perplexity in which operators find themselves owing to the order of the Coal Controller. Therefore transactions are limited to the barest necessities and as a result stocks are being accumulated, and smalls especially are rather considerably in excess of current requirements.

Prices officially quoted are for Best Admiralty large steam coal, 33s.; seconds and best seconds, 30s. 9d. to 31s. 6d.; ordinaries, 30s.; drys, 28s. 6d. to 30s.; best Black Veins, 30s.; Western Valleys, 29s.; Eastern Valleys, 28s. to 29s.; steam nuts, 28s. 6d. to 30s.; bunkers, 21s. 6d. to 23s.; No. 3 Rhonddas, large, 30s. 9d. and smalls, 27s.; No. 2 Rhonddas, large, 27s. and smalls 20s.; house coal, 30s. 9d. to 33s.; anthracite, 25s. 6d. to 30s.; and patent fuel, 36s. to 42s. 6d.

The Scottish coal markets show little, if any, change, though prices have been fixed at an appreciably higher level by the Coal Controller's order. The scheme has created a feeling of irritation in the trade. It is not fully understood, and is regarded as quite unlikely to influence port trade, which is the main requirement of the Scottish markets. Export business remains on a restricted scale, though the home demand is satisfactorily maintained and keeps the producers fairly well employed.

Quotations for splints are 28s. to 30s.; Hartleys, 29s.; Ell coal, 26s. 6d. to 28s.; Navigations, screened, 28s. to 30s.; and unscreened, 23s. 6d. to 25s.; steams, 27s. 6d.; and nuts, 21s. to 23s.

The Hull coal market is dull. Beyond the requirements of the authorities there is little export business, while on the other hand large quantities of coal comprising practically all that comes on the market is absorbed by the munition and manufacturing centres inland. Values are ruled by the official controlled figures. Practically the only department of the market which is at all quiet is the bunker coal section, in which little is doing.

In the Midlands the demand for all classes of coal continues to be extremely brisk. For house coal the requirements of merchants are greater for the time being than the pits can cope with, and this condition appears likely to continue. Orders are considerably in arrear in many cases, this being to some extent due to transport difficulties. Steam and gas coals are moving off freely.

On the London coal market it is a satisfactory feature that supplies have been coming to hand rather more freely of late, though not to the extent desired. House coal orders are being pressed on the market, and there is still some difficulty in getting supplies of best fuel. Steams and nuts are in strong request.

COMPANY MEETINGS.

Marconi International Marine Communication Company, Ltd.—The seventeenth ordinary general meeting was held on July 4. The Chairman (Mr. Godfrey Charles Isaacs), in moving the adoption of the report and accounts, said that the business was still being conducted under exceptionally unfavourable conditions. Practically the whole profits were derived from ships' subsidies, for there was practically nothing doing at the present moment in commercial or private telegrams at sea. Normally they derived a very substantial revenue from those telegrams, and on return to peace conditions they would, no doubt, see a very substantial increase in receipts derived from this source. Not only had the number of ship telegraph stations been immensely augmented during the war, but there had been also a large addition to the coast stations, which would give far greater facilities for communication with the land than obtained prior to the outbreak of hostilities. Further, there were very considerable losses in consequence of the submarine warfare, all of which were being debited to profit and loss. It was to be hoped that these losses would cease and that they would see additional revenue in consequence. In past years it had always been the custom to insure against risk of losses at sea, but the premiums having become so very high owing to the submarine warfare, they determined, after careful consideration, to take the risk themselves. During the year under review, notwithstanding the severity of the submarine warfare, they had saved under the war risk insurance the sum of £1,174, and in marine risk £451, or a total of £1,600, as a result of taking their own risk instead of paying the high rate of insurance premiums asked. The number of public telegraph stations owned and worked by the company on the high seas increased from 1,008 at the end of December, 1915, to 1,472 at the end of December, 1916. They would be able to appreciate the considerable capital expenditure they had been called upon to make when he told them that, up to June 30 this year, they had fitted 595 additional ships. This brought the total number of ships installed, after deducting losses, to 1,855, which was by far the biggest rate of increase in the history of the company. Orders in hand, too, were very considerable indeed, and they contemplated their being very largely augmented in the near future; for that provision must be made. There was one further figure it would interest them to know, and that was subsidies alone, at June 30, had increased to £451,713 per annum. When comparing this figure with £24,445, which were the total receipts for the year 1909, they would appreciate the rapid growth of the business and the necessity for summoning an extraordinary general meeting to approve of the company's capital being increased by the creation of 250,000 new shares. Mr. Alfonso Marconi seconded the motion, which was carried. The chairman then proposed that the capital of the company be increased by the creation of 250,000 new shares of £1 each, to be issued on such terms and conditions as the directors should think fit, such shares to rank *pari passu* in all respects with the existing 350,000 shares of £1 each.

Mr. M. A. Bramston seconded the motion, which was carried.

COMPANY REPORTS AND DIVIDENDS.

S.S. "Trongate."—Turnbull, Scott & Co., managers, have paid a dividend in respect of this vessel of £25 per 1-64 share.

Eskside Steam Shipping Company, Ltd.—Charles Smales & Sons, of Whitby, managers of the company, have paid a dividend of 25s. per share, being at the rate of 25 per cent.

Lancashire Shipping Company, Ltd.—The Directors have declared an interim dividend of 10 per cent. (less income tax), payable to shareholders registered in the Company's books on June 30.

Ungarische Luft u. Seeschiffahrts A.G.—With a state subvention of £75,000, this company shows a net profit of £176,000 (£91,800). The dividend has not yet been fixed; last year it was 10 kr. (8s. 6d.).

Marine Insurance Company, Ltd.—The accounts for 1916 show a premium and investment income of £1,573,000, from which have to be deducted settlements and office expenses amounting to £662,900, leaving a net profit of £910,100.

Bremer Schleppschiffahrts Gesell.—A dividend of 10 per cent. (*nil*) has been declared from the net profit of £19,100 (£20) realised last year. The book value of the fleet, viz., 20 (21) steamships and 96 (96) barges, &c., is given as £94,600 (£102,000).

Svenska Lloyd.—The net profit for 1916 amounted to £275,500, compared with £124,000 for 1915. The dividend has been raised from 20 per cent. to 30 per cent. and one new share granted in respect of each three old ones. The capital is thus raised to £107,500, and will now be doubled (to £215,000) by issue of new shares at par.

Oldenburg Portugiesische Dampfschiffs Rhederei.—A capital of £110,000 was represented at the general meeting on June 5, under the chairmanship of Ed. J. A. Siemers. The annual accounts were accepted and the whole superintending council re-elected, with the exception of Herr Burmester, who did not seek re-election.

Dundee, Perth & London Shipping Company.—The accounts for the year ended May 31 show that, after providing for depreciation and carrying £10,000 to meet excess profits duty, repairs, &c., there is a balance of £30,271. The directors recommend a final dividend of 15 per cent. per annum, making 12½ per cent. for the year, carrying forward £4,023.

Chadburns (Ship) Telegraph Company.—The directors announce that owing to exceptional circumstances it has not been found possible to complete accounts to March 31. They are, however, satisfied that the result of the year's trading warrants payment of a dividend at the rate of 10 per cent. per annum for the half-year ended March 31.

British Steamship Investment Trust, Ltd.—A final dividend of 15 per cent. and a bonus of 10 per cent., less income tax, are recommended for the year to June 30. The interim distribution was exactly the same, so that 50 per cent. is to be paid in all, compared with 45 per cent., which included what was called a "special" bonus of 25 per cent., for 1915-16. The profit for that year included a considerable sum provided for depreciation of securities, which was written back, as it was no longer required for that purpose.

Deutsche Dampfschiffahrts Gesell. Kosmos.—The Hamburg Senate has consented to this company being exempted from calling a general meeting and preparing a balance sheet in respect of 1916.

Emder Verkehrsgesellschaft A.G., Emden.—The gross profit for the past year amounted to £9,600 (£10,880). Business expenses amounted to £3,490 (£3,470), and statutory compensations to £1,475 (£1,380). The quay administration showed a loss of £2,630 (£1,775). Depreciation on stowing equipment, offices, &c., amounted to £1,895 (£1,700), leaving a surplus of £120 (£28), which is again carried forward.

Norwegian-American Line.—The directors of the Norwegian-American Line in their report for 1916 state that, after the necessary writing off and provision for war taxes and other extraordinary expenses, a net profit of 6,577,813 kr. is available, which the directors propose to distribute as follows :—20 per cent. dividend, absorbing 2,400,000 kr. ; to reserve fund, 3,000,000 kr. ; set aside for new office buildings, 500,000 kr. ; transfer to insurance fund, 239,575 kr. ; to fund for company's ordinary sailors, 200,000 kr., leaving 238,238 kr. to carry forward. A fund was also founded by the company with 200,000 kr. for the company's officials, afloat and ashore, to provide pensions.

Burns, Philp & Co., Ltd.—The report for the year ended March 31 last states that the gross profits from all sources (including balance brought forward) amount to £453,000. After deducting salaries, expenses, taxation, depreciation. losses, &c., there remains a net balance of £157,725. It is proposed to apportion that amount as follows :—Dividend of 1s. per share (on 1,050,000 shares), bonus of 6d. per share ; £50,000 to reserve fund (making a total of £150,000) ; £10,000 to staff bonus account ; £7,500 to insurance fund ; and to carry forward £11,475. The board recommend the distribution among the present staff of a bonus of 10 per cent. on their salaries, payment to be made as far as practicable in Commonwealth War Bonds.

Eastern & Australian Steamship Company, Ltd.—The report for the year 1916 states that the service was carried on with three steamers in the first half of the year and with two steamers only in the second half. There has been a substantial improvement in the trading profit, due partly to a larger amount of cargo having been available and partly also to a rise in freights, although the latter has not been so large as that which has occurred on most of the other trade routes. The profits earned by the steamers have amounted to £111,050, and after adding interest and deducting certain charges, including income-tax, there remains £76,703. The directors have transferred £20,000 to reserve, together with £5,000 which stood in the previous balance sheet as a provision against contingencies. With the amount brought forward there is a balance of £67,453, and the directors propose a dividend of 15 per cent. The strength of the cash position has been further increased, and it has now at its disposal a substantial sum for the building of new steamers to replace the older vessels which have been sold. The Ministry of Shipping has requisitioned both the remaining steamers.

The "Shell" Transport & Trading Company, Ltd.—The report for the year ended December 31, 1916, states that, including the balance of £420,303 brought forward from 1915, there is a credit to profit and loss of £2,126,146. Deducting management, interest, legal and other expenses and depreciation on securities, which in all amount to £146,746, there remains £1,979,400 to be carried to balance sheet. From this amount preference dividends (absorbing £100,000) and interim dividend (absorbing £408,290) have already been paid. After payment of the dividends distributed, there remains a balance of £1,471,110, from which the directors have declared a second interim dividend for the year 1916 of 5s. per share, to be paid on August 14 (making 35 per cent. for the year), which they now recommend shall be final, leaving a sum of £450,385 to be carried forward. The interim dividends are free of income tax. The directors regret that it is not possible to attach the summarised balance sheet of the Bataafsche Petroleum Maatschappij, owing to postal difficulties with Holland. The Anglo-Saxon Petroleum Company, Ltd., under existing circumstances of communication throughout the world, have found it impossible to obtain the mass of detail necessary to compile their complete balance sheet. In declaring their dividends upon estimates they have, however, made ample reserves for depreciation. Reports received from the Anglo-Saxon Petroleum Company, Ltd., and the Bataafsche Petroleum Maatschappij enable the directors to assure the shareholders of the continued prosperity of the business. The directors have obtained the sanction of the Treasury and have offered to the shareholders 1,000,000 new shares at par in the proportion of one new share to each four shares held. For the convenience of the shareholders it has been arranged that upon the expressed desire of a shareholder the amount of the dividend now declared may be allocated to payment for the new shares. The fact that the Royal Dutch Petroleum Company, Ltd., have largely increased the funds at their disposal during the current year, has rendered it desirable that this company should strengthen its own financial position, and that has been the determining factor in making the issue of shares at the present time. The representation of the company on the boards of the Anglo-Saxon Petroleum Company, Ltd., and the Bataafsche Petroleum Maatschappij remains unaltered.

COMPANY REGISTRATIONS.

Glen Line Eastern Agencies, Ltd.—Capital £10,000, in £1 shares. Objects : Shipowners, charterers, agents and brokers, freight, passenger, insurance, loading and emigration agents and brokers, freight contractors, &c. Signatories :

C. McGregor, 4, Lime Street, E.C. 3, steamship manager.
S. A. Morris, 1, East India Avenue, E.C. 3, steamship manager.

The first directors are to be appointed by the subscribers. Qualification : £1,000. Registered office : 4, Lime Street, E.C. 3. Private company.

Macfarlane Winch Company, Ltd.—Capital, £12,005, in 100 shares of 1s. each and 12,000 shares of £1 each. Objects, to take over from G. T. Macfarlane Patent 1089 of 1917, in connection with ships' winches, on the terms of an agreement between the said G. T. Macfarlane of the one part and the Power Plant Company, Ltd. (for this company), of the other part, and to carry on the business of mechanical, electrical, hydraulic, marine and general engineers, &c. Signatories :—

E. Trevor L. Williams, J.P., Clock House, Byfleet, Surrey.
G. T. Macfarlane, Innamincka, Cannons Lane, Pinner, Middlesex, mariner.

The first directors are E. Trevor L. Williams, J.P., and G. T. Macfarlane. Solicitors, Slaughter & May, 18, Austin Friars, E.C. Private company.

Knox Bros., Ltd.—Capital, £5,000, in £1 shares. Objects, to carry on the business of wholesale, retail and manufacturing dealers in high-pressure jointing asbestos, asbestos of all kinds, asbestos millboard sheets and washers, driving belts, indiarubber goods, all ship furnishing goods, ships' stores, cork, rope, flexible steel hawsers, wire ropes, cables, &c. Signatories (each with one share) :

Mary Harrison, Egerton House, St. John's Road, Buxton, engineers' merchant.
John A. Harrison, 3, Brierley Street, London, and Manchester, company director.

The first directors are to be appointed by the subscribers. Registered office, 180, Stockport Road, Ardwick, Manchester. Private company.

Dublin Dockyard (War Munitions) Company, Ltd.—Capital, £20,000, in £1 shares. Objects, to carry on the business of vendors of munitions of war carried on by Sir J. P. Griffith, W. Scott and J. Smellie, at 15A, East Wall, Dublin, the Dublin Dockyard (War Munitions) Company. Signatories :—

John P. Griffith, Rathmines Castle, Rathmines, Co. Dublin.
Walter Scott, Ivydene, Ailesbury Park, Dublin, shipbuilder.
John Smellie, St. Dympnas, Clontarf, Co. Dublin.

The first directors are J. P. Griffith, W. Scott and J. Smellie. Qualification, 200 shares. Registered office : 15A, East Wall, Dublin. Private company.

Marine Metal Company, Ltd.—Capital, £10,000, in £1 shares. Objects, concentrators, smelters, raisers, crushers, refiners and treaters of ores, minerals and alloys, engineers, founders, boilermakers, metal workers, shipbuilders, manufacturers of electrical or other furnaces for smelting or other purposes, &c. Signatories :—

H. S. Holt, 6, Gray's Inn Square, W.C., solicitor.
T. C. Ashcroft, 6, Gray's Inn Square, W.C., company secretary.

The first directors are to be appointed by the subscribers. Solicitors, H. S. Holt, 6, Gray's Inn Square, W.C. Private company.

Varipati, Ltd.—Capital, £20,000, in £1 shares. Objects, commission agents, importers, exporters, shipowners, charterers of ships and vessels, warehousemen, &c. Signatories :—

E. A. Clifford, Tara, Mill Way, Mill Hill, N.W., solicitor.
E. E. Dodd, 78, Mill Hill Road, Acton, W., solicitor's clerk.

The first director is M. Varipati (permanent). Qualification, 200 shares. Registered office, 23, Leadenhall Street, E.C. Private company.

NEWS PARAGRAPHS.

Japanese Trawlers.—The Japanese trawling fleet is gradually being depleted, and, quite recently, 47 vessels of the type were sold to the Italian Government, 30 to France and six to Ceylon.

Shipbuilding in Ontario. The Shipbuilders' Corporation of Toronto has been incorporated with a capital of $250,000; and the Goderich Dry Dock and Shipbuilding Company has been incorporated with an authorised capital of $1,000,000.

Bayerische Lloyd Schiffahrts A.G.—Dr. Ehrensberger, council member of the Krupp A.G., has been elected to the superintending council of the Bayerische Lloyd. Doubtless this election is in connection with the foundation of the Bayerischen Kruppwerke.

Societa Nazionale di Navigazione (Genoa).—It has been decided to raise the share capital from £595,000 to £2,390,000, and to issue £2,000,000 debentures. The company has purchased most of the Transatlantica shares.

James Scott, Ltd.—This firm of electrical and mechanical engineers, of Bootle, Liverpool, have taken over the business of Harford & Co., Tithebarn Street, Liverpool, as a going concern, and will use it as their offices, show rooms, and installation department.

Dutch Shipping to the East Indies.—The Nederland Company and the Rotterdamsche Lloyd are sending no more vessels directly to the Dutch East Indies until after the war. Every three weeks, however, a vessel of the Holland-America Line will sail for New York and passengers for the East Indies will be able to travel by this route and via San Francisco, whence a service will be maintained by the two first-named companies.

Quarantine in Mombasa. At a recent meeting of the Legislative Council of British East Africa, a member pointed out that Mombasa was one of the few ports in the world of its size where there was no machinery for disinfecting ships, with the result that long delays were of frequent occurrence, and heavy charges accumulated. The Acting Governor stated that the question of quarantine was now receiving earnest consideration of the Government.

State Control in Norway.—The Norwegian Staatsrat has passed a law (coming into force on June 15) authorising the Government to forbid owners of Norwegian vessels to make new freight contracts or extend existing ones. All owners possessing vessels in foreign service are required to supply particulars of current charters to the Norwegian Owners' Union. Contravention of the new law is punishable by imprisonment and a fine up to £27,500.

Jervell og Co.—According to *Norges Handels og Sjofartstidende*, the North Sea & Baltic Line, founded in Awlesund under the direction of this firm, will have a share capital not less than £550,000 and not exceeding £1,650,000. The amount subscribed up to the middle of June was about £386,000. It is the aim of the new undertaking to maintain a regular service, commencing after the war, between the Norwegian Baltic and North Sea Ports.

Stranded Liner Refloated.—The former Kosmos liner *Sesostris*, which was built at Flensburg in 1897 and which lay stranded on the coast of Guatemala for nearly 10 years, and was recently refloated by a British Columbia syndicate, has been sold to American interests. Under the name of *Frances L. Skinner* the vessel has been chartered by a Japanese company at a rate which, it is said, will cover the cost of salvage and repairs on the first voyage.

Civil Chronology in Navigation.—The German Verband Seeschiffer Vereine has received a copy of a letter from the Imperial Marine Amto for the Navy, in which it is proposed to introduce civil chronology instead of astronomical reckoning of items in navigation. Consent has been obtained from the naval authorities, but, since this is a matter which concerns all shipping, the Verband has been asked to consider the proposal and convey its views to the mercantile marine.

Danish Ship Sales Prohibition.—The Ministry of the Interior has issued a very rigid prohibition of ship sales. The prohibition includes all vessels on the Danish shipping register; vessels granted a provisional certificate of Danish nationality; and vessels (of tonnage liable to registration) built in Denmark to Danish account. The vessels may not be sold (either directly or by disposal of the building contract) to any foreigner or foreign power or body, without the consent of the Ministry of Commerce.

Lloyd Sabaudo (Genoa).—This company is raising its capital from £795,000 to £1,590,000.

Swedish Trade & Shipping Co. (Stockholm).—This company has been established with a share capital of £580,000.

State Bank for Norwegian Fisheries.—At the instigation of the Ministry of Commerce, Industry and Fishery, a commission has been appointed to consider the foundation of a State bank for the support of Norwegian fisheries. It is suggested that the new institution should be in the form of a loan bank, with a capital of £221,000, and a reserve fund of £11,500; the capital being raised by State-guaranteed debentures. The function of the bank would be to advance money needed to purchase, convert, and equip fishing vessels.

Shipbuilding Commission.—The Nova Scotia Shipbuilding Commission authorised by Premier Murray's legislation of last session has now been appointed. It will investigate and consider means and ways of encouraging the establishment and development of the shipbuilding industry in the province. The Commission is composed of five members, representative of financial, shipbuilding and general business interests in the province, with Mr. Dougald Macgillivray, Manager of the Bank of Commerce, Halifax, as Chairman, and Professor Murray Macneill, Halifax, as Secretary.

Reederei u. Schiffsmakler F. W. Dahlstrom.—This firm, which has just celebrated its jubilee, was founded in 1867 by F. W. Dahlstrom (brother of H. H. Dahlstrom, the "father" of the Nordostsee canal). At first activities were limited to shipbroking, but after the accession of the sons F. W. A. and E. F. A. Dahlstrom, the business was extended by foundation of the Reederei A.G. of 1896, and the Continentalen Reederei A.G. In addition, the firm is agent for the Holland-America line, the Hamburg-America Line for the West Coast route, and the Koninklijke West Indsche Maildienst.

The Composition of Fleets.—The German Reichstag recently considered the relative proportion in which submarine and high-sea fleets should be developed in future. This problem, says *Schiffbau* is based upon a fallacious premise, for as a matter of fact the desirable strength of the high-sea fleet is unaffected by and has no bearing on the strength of the submarine fleet. The two arms are independent, save that, in order that submarines may be used at all, the composition and strength of the high-sea fleet must be adapted to the programme of possible enemies, with full reference to the strategic influence of geographical factors.

Obstructing Armed Merchant Ships.—A new regulation under the Defence of the Realm Act (published in the *London Gazette* recently) provides that where any ammunition or explosive substance is carried on board any merchant ship for defensive purposes it shall be lawful for such ship to enter any dock, harbour, or port in the United Kingdom, notwithstanding any restrictions imposed by statute or by-law relating to explosive substances in force in the dock, harbour, or port, if all regulations made by the Admiralty for the safety of such ammunition and explosive substance are duly observed on board the ship; and if any person refuses to admit or hinders or obstructs the entry of any such ship in respect of which all such regulations are observed into the dock, harbour, or port, on the ground that she is carrying any ammunition or explosive substance, he shall, notwithstanding such restrictions, be guilty of a summary offence against the regulations.

Towage of Sailing Vessels.—The *London Gazette*, issued on July 3, announced that the Lords Commissioners of the Admiralty in exercise of the powers conferred upon them by the Defence of the Realm Regulations, have made the following Regulation:—(1.) As from July 10, 1917, every sailing vessel which exceeds 400 tons gross register, or which, though of less tonnage, carries a cargo exceeding four thousand pounds in value shall when approaching or leaving any port of the United Kingdom or when proceeding coastwise along the coasts of the United Kingdom, be towed within such limits as may be directed by any Naval officer who is authorised by the Admiralty to give orders to British ships, and every such vessel shall pay for such towage in accordance with the scale of fees which has been approved by the Admiralty. (2.) The master or other person in charge of any such sailing vessel shall comply with all such directions as to towage as may be given him, and if he neglect or refuse to do so he will render himself liable to be prosecuted under the Defence of the Realm Regulations. (3.) This Regulation shall not apply to a vessel not being a British vessel where the non-compliance with the Regulation takes place on the high seas outside the territorial waters adjacent to the United Kingdom.

New Japanese Steamship Service.—It is reported that the Osaka Shosen Krisha has decided to establish a service between Japan and Europe, via Cape Town. It already runs steamers to the east coast of South America.

High Price for Japanese Steamer.—The Kishimoto Steamship Company's *Kwanto Maru*, of about 6,200 tons d.w., formerly the *Wakool*, which was built in England in 1898, has, it is said, been sold for 3,000,000 yen. This price works out at nearly £50 a ton.

German Ships Leased from Portugal.—Sixty of the 76 German merchant steamships seized by the Portuguese Government have been leased to the British Government at a rental of £1,500,000 a year, to be paid after the war. The ships will then become a part of Portugal's merchant marine, which will consequently bring it up to quite good proportions.

Shipments to Russia.—In view of the scarcity of tonnage and of the importance of reducing congestion of traffic in Norway and Sweden, all persons desirous of exporting goods to Russia via Scandinavia should send full particulars as soon as possible to the Transit Department of the Russian Government Committee, India House, Kingsway, W.C. 2, who will endeavour to arrange shipment. In the case of goods whose export is prohibited application should only be made when the necessary permission has been obtained, and the number of the relative War Trade Licence or Commission Internationale de Ravitaillement Permit should be quoted.

Japanese Naval Programme.—Reuter's Agency is informed that because of the large amount of patrol work being done by the Japanese Navy, the Navy Department at Tokio will shortly ask the Imperial Diet for a vote of credit of more than 250,000,000 yen (£25,000,000). It is possible that recent Government changes in Japan will enable the naval authorities to ask for a larger sum, to be spent on the construction of submarines and smaller vessels needed in war. The money will be devoted to the building of at least one 32,000-ton battleship, two destroyers, two submarines and a ship of about 10,000 tons for special, unspecified uses. The armament of these vessels will be very up-to-date, special attention being given to the various weaknesses that have been brought into evidence during the war.

Bombs on a "Magazine."—In the aeroplane raid over London the Huns did some damage of naval importance by dropping a bomb on the premises of the firm of printers who were preparing "Sea Pie" for the bookstalls. The whole of the first edition, issued under the auspices of the Navy League, and sold for the benefit of British naval prisoners in the hands of the enemy, was in the building at the time. Notwithstanding the fact that the two top stories were demolished, and the lower floors suffered severely from a fire which broke out, great damage being done by flames and the water poured on them, much of the edition of "Sea Pie" was saved, and by the energy of the publishers and the kind help of several printers, a second edition was promptly got ready to replace the copies destroyed. The magazine is now on sale everywhere.

Danish Steamship Company of 1915.—This company was founded in March, 1915, with £27,500 share capital, and bought the ss. *Dannevang* (1,246 gross tons) and the ss. *Dannevirke* (1,432 gross tons). The *Dannevang*, whose book value was £19,800, was sunk in August, 1916, thus bringing in £60,600 insurance money, *i.e.*, £40,800 net profit. Owing to the insistence of certain shareholders this surplus was distributed in the form of a special dividend of 140 per cent. over and above the ordinary working dividend of 45 per cent. Last January, the *Dannevirke* was sunk in her turn, and no less than £77,000 of the £96,400 insured value was clear profit! One of the principal shareholders now proposes that the company be wound up. This course cannot be adopted without the consent of the holders of at least two-thirds of the total capital. The proposal is to be considered at a special general meeting, but there is an agitation in Denmark in favour of the Government compelling the company to apply some of its profits to providing new vessels. For reasons which may not be entirely disinterested, *Hansa* says: "One cannot expect shareholders to take on this new risk simply for the sake of increasing the Danish mercantile fleet, especially as the latter is already greater than required for the needs of the country. The firm was founded as a speculative concern operating at great risk. Things have gone well with it so far. New vessels could not now be provided from the available capital and, at present prices, it is very doubtful if they could be made to show a profit. Now shareholders would secure about four times their original investment, but in the near future the firm might be working at a loss. Dissolution is the course to be taken by anyone not obsessed by a blind desire for speculation." As already suggested, this emphatic (German) advice may not be wholly disinterested.

Germany's Ruined Shipping.—A Reuter message from Amsterdam states that Herr Paul Mueller, Social Democrat, emphasises the necessity of fully compensating the German mercantile fleet for the losses it has suffered through the war. He says that about two-thirds of all German merchantmen were abroad when war broke out, and he estimates the loss at 1,000,000,000 to 1,500,000,000 marks (£75,000,000), which he declares must be covered from State funds.

German War on Norwegian Shipping.—The *Tidens Tegn* (Copenhagen) states that since the commencement of the war 562 Norwegian ships, of a total tonnage of 800,000 tons, have been destroyed by German submarines. Furthermore, there are a great number of ships whose fate is unknown. The Norwegian merchant fleet has lost about 1,000,000 tons of shipping, as well as 600 or 700 lives, owing to German submarine activity.

Arbitration and Requisitioned Ships.—An important point of procedure relating to arbitration on losses of requisitioned ships has just been decided by the Divisional Court. In two cases questions of compensation and of the amount of hire were referred to arbitrators appointed by the President of the Admiralty Transport Arbitration Board. Points of law arose in the course of the proceedings, and it has now been held that a statement of a special case to the courts on them is permissible.

Cargo from South Africa.—All homeward freight by steamers beginning to load at Delagoa Bay or at ports in the Union of South Africa must be paid under one of the following methods at shipper's option:—(*a*) Cash in exchange for bills of lading; (*b*) bankers' sight draft on London in sterling in exchange for bills of lading; or (*c*) at destination on demand on receipt by the line of cable advice from the agent, giving name of firm by whom freight is payable and amount is collectable, cost of cabling to be collected with freight.

Allowances to Dependants of Officers and Seamen.—The Imperial Merchant Service Guild has been notified by the Board of Trade that it has been decided to increase the allowances to dependants of Officers and Seamen taken prisoners from British ships interned in enemy ports at the outbreak of war to the scale now in force for Officers and Seamen taken prisoners from British ships at sea. If the present allowance, viz., £1 a week or half wages, exceeds that payable under the new scale, the present allowance will continue. The concession marks the successful termination of the Guild's persistent representations to the Government.

Shipbuilding in Australia.—With reference to the statement made by Mr. Hughes, the Federal Premier, that it would be useless to embark on any great enterprise of shipbuilding unless sufficient labour were forthcoming, Mr. Cook, the Minister for the Navy, said they could not get economical ship construction in Australia unless there was a definite and continuous programme of shipbuilding. This was one of the things occupying the attention of the Ministry now. A definite programme was required so that skilled men could be kept continuously employed. The cruiser *Brisbane*, which was built in Australia, had been serving abroad for some time, and he thought her cost would not be far short of double that of her sister ships.

New Zealand Shipping Regulations.—A *Reuter* message from Wellington, N.Z., states that an Order in Council has been adopted prohibiting, except with the consent of the Minister of Marine, the transfer of registry of any New Zealand ship to any port of registry outside New Zealand, or the removal of any such ship from the register of British shipping. It also prohibits the sale, transfer, or mortgage of any New Zealand ship, or the granting of a charter except to ships trading during the last 12 months outside New Zealand. Finally, the order directs that no New Zealand ship shall leave the Dominion for an oversea port nor be withdrawn from New Zealand trade unless licensed to do so by the Minister of Marine.

Canadian Shipbuilding.—The International Shipbuilding Corporation, which has a branch at Newcastle, N.B., has bought the Sydney Foundry Company, N.S., which it intends to expand for the construction of marine engines and auxiliaries. For ship repairing it has also bought a small floating dock in Halifax. The first steel steamer launched in British Columbia was sent down the ways of the Wallace Shipyard Company, Vancouver, a few weeks ago, and named *War Dog*. This vessel, which has a length of 315 ft. with a beam of 45 ft., was ordered by a Japanese Company, but has been sold to a British firm. The Port Arthur Shipbuilding Company has six canal boats, each 261 ft. long, in hand. At present 650 men are employed there, but it is expected that the number will soon be 1,000.

"SHIPBUILDING AND SHIPPING RECORD" TABLE OF SHIP SALES.

Name and Type.	Tonnage.	Dimensions. Draught in ( ).	Sold by, to	Builders, hull and year.	Machinery and builders.	Remarks.
Algeriana, ss. (spar dk.) (ex *Dettingen*, ex *Cebrenna*, ex *Twickenham*)	4,221 gr. 2,736 net 7,373 d.w	360½′ × 48′ 20′ (25′ 9″)	Archangel London Transport Co., London, to B. J. Sutherland & Co., Newcastle	Short Bros., Sunderland (1899)	25, 41, 69 × 48 (W. Allan & Co., Sunderland)	Price about £85,000 with delivery at the Cape
Antenor, ss. .	5,319 gr. 3,392 net	422′ × 49½′ × 28½′	Nederlandsche Stoomv. Maats. Oceaan, Rotterdam, to British buyers	Workman, Clark & Co., Belfast (1896)	29, 50, 82 × 60 (Workman, Clark & Co.)	—
Arendal, ss. (iron, single dk.)	1,387 gr. 876 net 1,925 d.w.	256½′ × 34′ 17′ (17′ 2″)	Akties. Arendal, Arendal, to British buyers	Earle's Co., Ltd., Hull (1885)	19½, 30, 52 × 33 (Earle's Co.)	—
Bay Fisher, ss.	478 gr. 195 net 575 d.w.	168½′ × 25½′ 10½′ (12′ 4″)	J. Fisher & Sons, Barrow-in-Furness, to Thordis S.S. Co., Bolton	Dublin Dockyard Co., Dublin (1904)	20, 42 × 30 (Rentrew Bros. & Co., Irvine)	—
Bluefields, ss. (single dk.)	1,002 gr. 630 net 1,200 d.w.	224′ × 31½′ 14½′ (13′)	O. & A. Irgens, Bergen, to buyers not stated	Bergens Mek. Vaerks, Bergen (1905)	19, 30, 50 × 33 (Bergens Mek. Vaerks.)	Price about £55,000.
Bonaventure, ss. (single dk.)	1,118 gr. 461 net	240′ × 35½′ 16½′ (17′ 7″)	"Bonaventure" S.S. Co., St. John's, Newfoundland, to buyers not stated	Napier & Miller, Ltd., Glasgow (1909)	22½, 37, 61 × 42 (D. Rowan & Co., Glasgow)	—
Centralia, ss. (wood)	487 gr. 324 net	160′ × 36′ 12′	Centralia Co., S. Francisco, to the Gulf Mail S.S. Co.	J. Dickie, Alameda, Cal. (1902)	11, 18½, 32 × 24 (Golden State & Miners' Iron Works, S. Francisco)	—
Eskasoni, ss. (single dk.) (ex *Wilhelmina*)	2,671 gr. 1,682 net 4,500 d.w.	314′ × 43′ 21½′ (20′ 3″)	Gaston Williams & Wigmore Co., of London and New York, to buyers not stated	Short Bros., Sunderland (1896)	21, 37½, 61 × 42 (Blair & Co., Stockton)	Price about £90,000. Sold in 1915 for about £50,000.
Gemini, ss. (single dk.) (ex *Dingwall*)	2,128 gr. 1,366 net 3,500 d.w.	275½′ × 37½′ 18½′ (20′ 2″)	"Gemini" S.S. Co., London, to British China S.S. Co., Shanghai	Blyth S.B. Co., Blyth (1892)	20, 33, 54 × 36 (Black, Hawthorn & Co., Gateshead)	—
George E. Warren, tank ss.	2,306 gr. 1,616 net	246¾′ × 43¾′ × 25½′	Boston Virginia Transptn. Co., New York, to the Sinclair Gulf Corpn.	Toledo S.B. Co., Toledo, Ohio (1912)	21, 34½, 57 × 42 (Toledo S.B. Co.)	—
George Hawley, tank ss.	2,549 gr. 1,699 net	247′ × 43¾′ × 28½′	Boston Virginia Transptn. Co., New York, to the Sinclair Gulf Corpn.	Gt. Lakes Eng. Wks., Ashtabula (1912)	21, 34½, 57 × 42 (Gt. Lakes Eng. Wks., Detroit)	—
Knut Skaaluren, ss. (wood, single dk.)	687 gr. 398 net	171′ × 29½′ × 16½′	Hans B. Ramton, Arendal, to Capt. C. Schonbye, Christiania	Knut Skaaluren, Rosendal (1899)	13, 21, 33 × 27 (Akers Mek. Verks, Chr.stiania)	Price about £47,500.
Livonia, ss. (single dk.)	1,879 gr. 1,175 net	285½′ × 42¼′ × 17′	P. Brown, Junr., & Co., Copenhagen, to Lambert Bros., London	Howaldtswerke, Kiel (1904)	21, 33, 55 × 35½ (Howaldtswerke)	—
L. V. Stoddard, tank ss.	2,306 gr. 1,616 net	246½′ × 43½′ × 25½′	Boston Virginia Transptn. Co., New York, to the Sinclair Gulf Corpn.	Toledo S.B. Co., Toledo, Ohio (1912)	21, 34½, 57 × 42 (Toledo S.B. Co.)	—
Northfield, ss. (single dk.)	2,099 gr. 1,329 net 3,500 d.w.	288½′ × 43′ 18½′ (18′ 2″)	Keep S.S. & Lighterage Co., London, to M. Contsant, London	Tyne I.S.B. Co., Ltd., Newcastle (1901)	21, 35, 57 × 30 (N.E. Mar. Eng. Co., Newcastle)	—
Quintero, s.v. (ex *Ellerbek*, ex *Emin Pascha*)	1,611 gr. 1,512 net 2,600 d.w.	259′ × 38½′ 21′	Buchanan, Jones & Co., Valparaiso, to buyers not stated	Grangemouth Dockyard Co. (1890)	—	Price about £35,000.
San Gabriel, ss. (wood)	484 gr. 312 net	158′ × 33½′ 11′	Kerckhoff-Cuzner Mill & Lumber Co., Los Angeles, to Gulf Mail S.S. Co.	United Eng. Wks., S. Francisco (1903)	14, 32 × 24 (United Eng. Wks.)	—
Sea Hawk (trawler)	169 gr. 64 net 170 d.w.	108½′ × 20½′ × 11′	Duncan & Leith, Aberdeen, to buyers not stated	J. Duthie, Sons & Co., Aberdeen (1898)	13½, 32½ × 21 (Hall, Russell & Co., Aberdeen)	Price about £9,000.
Sörhaug, ss. (single dk.) (ex *Rask*)	1,077 gr. 599 net 1,500 d.w.	224½′ × 32′ × 13½′ (14′ 6″)	Dampskibs Aktie Haug, Haugesund, to buyers not stated	Laxevaags Mek. Jrnskb., Bergen (1898)	15½, 25, 42 × 30 (Laxevaags Mek. Jrnskb.)	Price about £85,000.
Tres, ss. (single dk.)	900 gr. 600 net 1,300 d.w.	202′ × 31½′ × 14½′	J. S. Kallevig, Arendal, to French buyers	Porsgrund Mek. Vaerks, Porsgrund (1916)	14, 23, 38 × 27 (Porsgrund Mek. Vaerks)	Price about £70,000.
Yewdale, ss. . .	477 gr. 184 net 550 d.w.	165½′ × 26′ × 10½′ (12′ 4″)	W. Postlethwaite & Son, Liverpool, to buyers not stated	Scott & Co., Bowling (1890)	14, 23, 36 × 27 (Muir & Houston, Glasgow)	—

Egyptian Port Statistics.—The annual return of shipping, cargo and passenger traffic in the ports of Egypt and Suez Canal transits for the year 1916 shows that during the past 12 months 554 steamers arrived at Alexandria, 479 with cargo and 75 in ballast; 870,361 tons of cargo were discharged, and 7,107 passengers landed; 393 sailing vessels arrived, 311 in foreign trade and 82 coasting; 705 steamers left Alexandria, 496 with cargo and 209 in ballast; 887,053 tons of cargo were shipped, and 11,877 passengers were embarked. Of the sailing vessels which left Alexandria 327 were engaged in foreign trade and 80 coasting.

Austro-Hungarian Shipping.—According to *Hansa*, the building programme of Austro-Hungarian owners includes the following items:—Two seagoing steamships, one tug and two lighters (totalling 7,545 gross tons and 21,000 h.p.), are to be built for the Oesterreichischen Lloyd. The Ungarisch-Kroatische A.G. has ordered a 1,200-ton twin-screw high-speed steamship, a cargo and passenger vessel of 1,000 tons and a small saloon steamer for coastal traffic. The Adria A.G. has a number of vessels on order and hoped to have 15 delivered by 1919, but this programme has been, and is likely to remain, delayed by the war. A number of large cargo vessels are under construction for the Triester Freie Schiffahrt A.G., and when these are delivered, the company's fleet will amount to 120,000 tons, as against 80,000 tons in 1914. Most of the new vessels are cargo vessels of 8,750 tons d.w. capacity and a speed of 11 knots. The "Atlantica" Seeschiffahrts A.G. (Budapest) has decided to lay down a modern shipyard of its own for the construction of small seagoing vessels, as well as river craft for the Danube.

SHIPPING SHARE MARKET.

The stock markets concerned with transactions in shipping companies' shares have been steady throughout the week without any notable changes in price. Some attention has been directed to the comments of the Chancellor of the Exchequer on the profits he has made from investments in shipping companies' securities. A shareholder of the Royal Mail Steam Packet Co. points out that he has received dividends during the last three years averaging £4 6s. 8d. per cent. against £4 1s. 5d. for the seven years preceding the war, or, allowing for income-tax, less since than before the war. As this company owns the entire capital of the Pacific Steam Navigation Co., the Nelson Steam Navigation Co., the Nelson Line, Liverpool, and nearly all the capital of the Union-Castle Line, Elder Dempster & Co., and Lamport & Holt, it is pointed out that there have been no such profits on the scale that Mr. Bonar Law suggested. The dividend paid by the Peninsular & Oriental Co. has averaged for the past five years 15·6 per cent. as against 15 per cent. before the war, and that paid by the Furness Co. has averaged 12 per cent. as against 10 per cent. before the war. There are many similar instances, particularly of preference shareholders who have only just received a bare 5 per cent. on their investments. It is a significant commentary upon the statements made that the 6 per cent. non-cum. preference stock of the Cunard Steamship Co. is purchasable at the present time in the open market at below par, and the attainment of par by the company's debentures is recorded this week as a point of exceptional interest. Among shares which have been marked ex dividend during the past week are Britain Steamship ordinary (£2 net), Lancashire Shipping (2s.), London American Trading (1s.), Tatem Steam Navigation (2s. net), Khedivial ordinary (2s. net), Cairn Line (1s. net and bonus), and Frederick Leyland preference (5s.). Khedivial Steamship shares continue to be strongly supported among the low-priced shares, and they have already partly recovered the dividend deducted. Among armament and iron and steel shares there has been a steady demand from provincial centres, and the group of explosives companies has again been in demand on some speculative buying.

SHIPPING, SHIPBUILDING, ENGINEERING AND MARINE INSURANCE SHARE LIST.

SHIPPING.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
African S.S.	20	33—23½	10	6¾	29	
Allan Line ... Deb.	100	—	4	4⅜	92	
Anchor Line ... Cum. pref.	10	9¼—9½	5⅜	5⅝	9	
Do. ... ... Deb.	Stk.	105½—102½	4⅜	4⅜	102	
Argentine Nav. ... Cum. pref.	1	19/6—11/-	Nil.	Nil.	13/3	—7/3
Do. ... ... Deb.	Bds.	93⅜—84	6	6	99	
Australasian Un. S. Nav. Deb.	Stk.	83⅜—80⅛	4	5	80	
Belfast Steam ... ... "A"	10 (5pd.)	—	5	5	5	
British & African Nav. Deb.	Stk.	96¾—91	4⅜	4⅜	102	
British India Nav. ... Deb.	Stk.	94⅛—88½	4½	5⅛	81xd	
British S.S. Invest. Trust Def.	Stk.	357—190	30*	8⅜	350	
Do. ... ... Pref.	Stk.	108—105½	6	6	101	
Do. ... ... Deb.	Stk.	79—77½	4½	5¼	76	
Cairn Line ... ... Deb.	Bds.	99—88	5	5⅝	90⅜-91	
Do. ... ... Ord.	1	—	20†	8⅛	45 -	
Clan Line ... ... Ord.	10	32½—22½	25	9⅜	26 9/16	
Court Line ... ... Ord.	£1	42/- -26/-	20	12	33/9	- -/9
Cunard SS. ... ... Ord.	1	101/- -68/-	20*	5	80 -	—1/6
Do. ... Cum. pref.	Stk.	95—89	5	5⅝	82	—2
Do. ... ... Deb.	Stk.	99⅜—93½	4⅜	4⅝	96	
Elder Line ... ... Deb.	Stk.	97⅞—89⅛	4⅜	4⅜	103	
Elder Dempster ... Cum. pref.	1	20/6 -18/1⅔	5⅓	5¼	19/3	
Do. ... ... Deb.	Stk.	92½—88⅜	5	5⅝	87	
Ellerman Lines ... Pref. Ord.	10	9⅛—9⅛	6⅔	6⅔	8⅜	
Do. ... Guar. pref.	10	9 1/16—8⅝	4⅜	5¼	8⅜	
France Fenwick ... Cum. pref.	5	99/5—92/6	5⅜	6¼	90/-	
Furness, Withy ... Ord.	1	61/3 -34/3	20*	9⅜	48/6	—1/-
Do. ... Cum. pref.	10	9½—7 3/16	5	6¼	8⅛	
General Steam Nav. Ord.	7½	12⅜—8½	15	7⅜	22/6	
Do. ... ... Pref.	8	7⅛—6⅜	6	7⅜	15/-	-1 -
Houlder Line ... Cum. pref.	5	83/9—67/6	5⅓	7¼	81/10½	
Do. ... ... Deb.	Stk.	—	4⅜	4 15/16	95	
Houlder Bros. ... Cum. pref.	5	—	5⅓	5 9/16	4	
Do. ... ... Deb.	Stk.	—	4⅜	5⅛	82	
India Gen. Nav. & Rly. ... Ord.	10	12—8¾	8	8¼	10⅜xd	
Indo-China N. ... Pref. Ord.	5	5 1/16—90/-	6	6⅔	90 -	
Irrawaddy Flotilla	40	—	15	5⅜	116	
Khedivial Mail ... ... Ord.	1	37 —10/-	25	13¾	38/1⅓	- -/4½
Do. ... ... Pref.	5	77/6—60/6	5⅜	7⅜	73/9	
Do. ... ... Deb.	Stk.	94¾—87¼	4½	4⅝	96	
King Line ... ... Ord.	10	20—12⅜	16*	9⅜	37	
Lamport & Holt ... Cum. pref.	£1	20/9 —18/9	6	6	19/7½	- -/4½
Leyland (F.) ... Cum. pref.	10	8¼—6 1/16	5	6⅜	7⅜	
Mercantile SS. ... ... Ord.	5	18⅜—12	40	13	15	
Do. ... ... Pref.	1	20/1⅜—20/-	5	6¼	16 3	
Moor Line ... ... Ord.	10	—	30	13	24½	
Nelson Steam Nav. ... Deb.	100	98⅜—97½	5	5⅛	98¾	
New Zealand ... ... Ord.	£10	—	8	2⅜	32 1/16	
Do. ... ... Deb.	Stk.	90⅜—88	4	4½	88	
Nitrate Producers SS. ... Ord.	5	25¼—18	30	6¼	24½	
Do. ... Cum. pref.	5	—	5	5	5	
Oceanic Steam. Nav. ... Deb.	100	99—95½	4⅜	4⅜	84	
Orient.Stm.Nav.Co. Cum. pref.	10	9⅜—9 1/16	5	5½	9	
Do. ... ... Deb.	100	98—91⅔	4½	5⅛	89	
P. & O. S. N. ... Cum. pref.	100	100 91	5	5⅛	89⅛	
Do. ... ... Def.	100	349—270	18	5⅔	323	+2½
Do. ... ... Deb.	Stk.	71—69	3½	5⅜	65 1/16	
Prince Line	1	95/—26/-	30	8⅛	87/6	
R.M.S.P. ... ... Ord.	100	134⅜—97½	7	6¼	117⅛	—1
Do. ... ... Pref.	Stk.	86⅞—76½	5	6½	80⅞	
Do. ... ... Deb.	Stk.	89—86	4½	5⅜	83⅜	+1⅛
Shaw, Savill & Alb. Cum. pref.	5	95/—88 3	5	5⅔	81/3	
Shell Transport ... ... Ord.	1	6—4⅛	35	5⅛	6⅛	
Do. ... Cum. pref.	10	10⅛—9	5	5⅜	9⅛	
Sutherland SS. Co.	£1	69/6 —41/6	30	10	54/6	
Union-Castle SS. Cum. pref.	10	7 1/16—7	4⅜	5	7⅜	
Do. ... ... Deb.	Stk.	92⅞—86⅜	4	4⅜	87⅛	
West Hartlepool ... ... Pref.	10	8⅛ -7⅜	5½	7 1/16	7¾	

INSURANCE.

Alliance	20 (2·4 pd.)	10½—8¾	12/-	6⅜	9⅜	— 3/16
Indem. Mutual Marine	15 (3 pd.)	13½—9⅜	15/-	5	20⅜	
London Assurance	25 (12½ pd.)	52⅜—42½	20	6	54	+1¼
Marine Insurance	25 (15 pd.)	36¾—33⅜	45/-	6⅞	37⅜	
Merchants' Marine Insurance ...	10 (2½ pd.)	7⅛—71/3	10	6	10¼	— ¼
N. British & Mercantile Ord.	25 (6¼ pd.)	34⅜—29	40/-	6⅜	32½	
Phœnix Assurance	10 (1 pd.)	7½—5¼	40	7	6⅜	— 3/8
Reliance Marine	10 (2 pd.)	—	20	4⅜	7¾	
Royal Exchange Assurance ...	Stk.	189½—181	10	5⅜	200	
Sea Insurance	10 (2 pd.)	19⅜—19⅛	10	5⅞	21⅛	
World Marine, Limited ...	5 (2 pd.)	61/3—35/-	5	5⅜	4⅜	

IRON AND STEEL.

Name.	Share and paid.	Extreme quotations, 1916.	Last ann. div. % or per share.	Yield. %	Last Quotation	Rise or Fall.
	£					
Babcock & Wilcox... ... Ord.	1	64/6-47/10⅜	15	5	59/3	+ -/3
Baldwins ... Cum. pref.	1	1⅛—1	5⅜	5⅜	20/-	
Do. ... ... Deb.	Stk.	87⅜—86¼	4⅜	5	86⅜	
Bayliss, Jones ... Cum. pref.	1	—	5	7¼	1 1/16	
Bell Bros. ... ... Cum. pref.	10	10 3/16—9 3/16	6	6	9¼	
Do. ... ... Deb.	Stk.	80—78⅜	5	6⅜	73⅛	
Bessemer (Henry) ... Ord.	1	29/-—26/-	12⅜	12	25/3	
Bolckow Vaughan ... Ord.	1	25/10⅜-18/-	11	9⅛	25/7½	+ -/9
Do. ... ... Cum. pref.	20	19—18	5	5⅝	16⅜	
Cargo Fleet Iron ... ... Ord.	1	23/3-13/10⅜	3	3⅜	21/4½	
Do. ... ... Deb.	100	86¼—84	4⅜	5⅛	84	
Consett Iron Co. ... ... Ord.	1	89/4⅛—65/3	50	11⅛	89,6	
Dominion Iron & Steel	Bds.	83—78	5	6⅜	78	
Dorman, Long ... ... Ord.	1	36/—22/3	14	9	37/-	— -/9
Do. ... ... Deb.	Stk.	97⅜—97	4	5⅛	74	
Ebbw Vale Steel & Iron Ord.	1	28/7⅜—19/-	12⅜	9⅛	28/9	+ -/7½
Guest, Keen & Nttefids Ord.	1	71/3 -60/-	15*	4⅜	77/6	+1/3
Do. ... ... Cum. pref.	5	5⅞—5⅜	5	4⅜	5⅜	
Do. ... ... Deb.	Stk.	82¼—80⅜	4	5⅛	76	
Hadfield's Steel Foundry Ord.	1	82/6 -69/-	30	7⅜	83/9	
Ibbotson Bros.	5 (4 pd.)	8—6	7⅓	4⅜	6½	
Jessop (W.) & Sons ... Ord.	5 (4 pd.)	9—8	15*	7¼	8⅜	
Lanarkshire Steel Cum. pref.	10	—	5	7⅛	7	
Lysaght (J.) ... Cum. pref.	1	22/7½—20 3	6	6	20/-	
Do. ... ... 2nd pref.	1	21/1⅜—21/-	6	6	20/-	
Manganese Bronze ... Ord.	1	—	6	11	1 1/16	
Do. ... ... Cum. pref.	1	—	6	8	3/4	
North-Eastern Steel ... Deb.	Stk.	—	4⅜	—	—	
Palmers Ship & Iron "A"	1	12/6—9/-	Nil.	Nil.	9/9	
Scott (Walter) ... ... Ord.	1	26/3—17/9	15	14¼	22/-	
Do. ... ... Pref.	1	16/10⅜—16/3	6	7	15/-	
Sheffield Forge ... ... Ord.	1	—	15	6⅜	53/6	
Shelton Iron & Steel ... Ord.	1	20/4⅛—15/-	7½	8⅜	19 7½	+ -7½
Do ... ... Deb.	100	94—92½	5	5⅞	91½	
S. Durham Steel & Iron Ord.	1	37/6—27/-	10	6⅜	34/9	+ -/6
Do. ... ... Cum. pref.	1	21/—19/-	6	6⅛	20/-	
Do. ... ... Deb.	Stk.	82—80	4⅜	5⅜	81	
Steel Co. of Scotland ... Ord.	10	—	10	10	12/1/-	
Stewarts & Lloyds Pref. ord.	10	18⅜—17	10	5¼	15⅝	
Do. ... ... Cum. pref.	10	—	6	4⅜	13 1/16	
Stone (J.) ... ... Cum. pref.	10	—	5	6¼	8	
United States Steel ... Ord.	100$	144⅝—83¼	8	7	113⅜	
Do. ... ... Cum. pref.	100$	123⅜—112¾	7	5⅜	125	
Vickers Ltd. ... ... Ord.	1	40/3—33/6	12⅜	7⅜	38/6	— -/9
Do. ... ... Pref.	Stk.	93—85	5	6	82⅛	
Do. ... ... Deb.	Stk.	83 -75	4	5 3/16	77	
Weardale Steel ... Def. ord.	1	31/—19/1⅔	19⅓	11	27/3	+2/3
Do. ... ... Cum. pref.	1	23 6 —17 6	6	6	21/-	
Do. ... ... Deb.	Stk.	70⅜—69¼	4	6	65½	
Workington Iron & Steel Ord.	1	24/3—14/3	10	7⅜	27/6	

SHIPBUILDING AND MARINE ENGINEERING.

Armstrong, Whitworth Ord.	1	43/—34/6	12⅜	7	39/9	- -/6
Do. ... ... Cum. pref.	5	75/—67/6	4	5⅜	69/4⅓	
Do. ... ... Deb.	Stk.	80⅜—75	5	6⅜	74⅛	—2
Beardmore (W.) ... ... Deb.	100	99—92	4⅜	4⅜	97	
Brown (John) ... ... Ord.	1 (15s. pd.)	27/3 —20/6	12⅜	8⅛	25/6	
Do. ... ... Cum. pref.	10	10—5⅜	5	6⅜	8⅞	
Cammell Laird ... ... Ord.	5	7—98/-	10	8⅜	6 1/16	
Do. ... ... Cum. pref.	5	88/—76/3	5	6⅜	80/-	
Do. ... ... Deb.	100	93⅜—85	4⅜	5⅜	83	
Dunlop (Jas.) ... ... Ord.	1	19/7⅜-13/4⅜	10	11⅛	17/6	
Do. ... ... Cum. pref.	1	17/1⅜-16/4⅜	6	7⅜	17/6	
Fairfield Shipbldg Cum. pref.	10	8⅜—8 1/16	6	8 3/16	8	
Fleming & Ferguson ... Ord.	10	—	10	7	14½	
Gray (Wm.) ... ... Deb.	100	100¼—99¼	4⅜	4½	100⅛	
Hawthorn (R. & W.) Leslie Ord.	10	15⅜—14	12⅜	8	15¾	
Henderson (D. & W.) Cum. pref.	1	—	5	8⅜	1/16	
Richardsons Westgarth Ord.	1	7/9—2/10⅜	Nil.	Nil.	5/-	
Do. ... ... Cum. pref	1	15/7⅜—8/-	Nil.	Nil.	13/6	
Do. ... ... Deb.	Stk.	69—67½	4⅜	6¼	62	
Simons (W.) ... Cum. pref.	10	—	5	5	9 1/16	
Swan, Hunter & W. R. ... Ord.	1	35/6—26/-	12⅜	7	39/-	+2/6
Do. ... ... Cum. pref.	1	18/9—17/-	5	5⅞	17/6	
Do. ... ... Deb.	Stk.	82—80⅜	4⅜	5⅜	79	
Thornycroft (John I.) ... Ord.	1	38/9—21/9	17⅜	10	37/6	
Do. ... ... Cum. pref	1	18/6—16/3	6	6⅜	16/9	
Do. ... ... Deb.	100	95⅜—88	5	5⅜	87⅞	
Wallsend Slipway ... Ord.	1	2—1⅜	10	5	2	
Do. ... ... Cum. pref.	1	1—1	5	5	1	

* Including bonus. † Also 20 % in shares.

"INTERNATIONAL" (Regd.)

ANTICORROSIVE AND ANTIFOULING COMPOSITION.

"NATIONAL" (Regd.)

ANTICORROSIVE AND ANTI-FOULING COMPOSITION.

"DANBOLINE" (Regd.) for Ships' Holds, Bunkers, &c.

Regd.

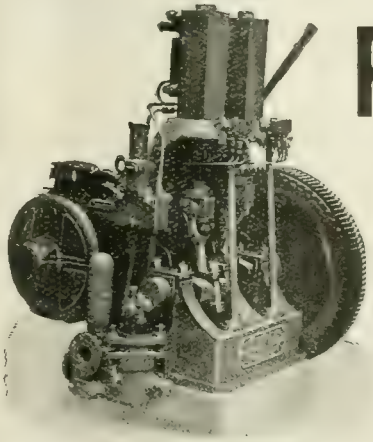
TRADE MARK.

HOLZAPFELS LIMITED,

HEAD OFFICE & WORKS: NEWCASTLE-UPON-TYNE.

And at LONDON, LIVERPOOL, GLASGOW, CARDIFF. Agencies at all Ports.

A BRITISH COMPANY EMPLOYING ALL BRITISH LABOUR.



NAVAL TYPE MACHINE.

REFRIGERATING MACHINERY

(CARBONIC ANHYDRIDE and AMMONIA COMPRESSION SYSTEMS)

for Cooling Ammunition Rooms, Storage of Provisions, Carriage of Chilled and Frozen Meat, Fruit, etc., and making ice

as supplied to

THE BRITISH AND FOREIGN NAVIES & THE LEADING STEAMSHIP LINES.

J. & E. HALL, Ltd.,

DARTFORD IRONWORKS, KENT, and 10, ST. SWITHIN'S LANE, LONDON, E.C.

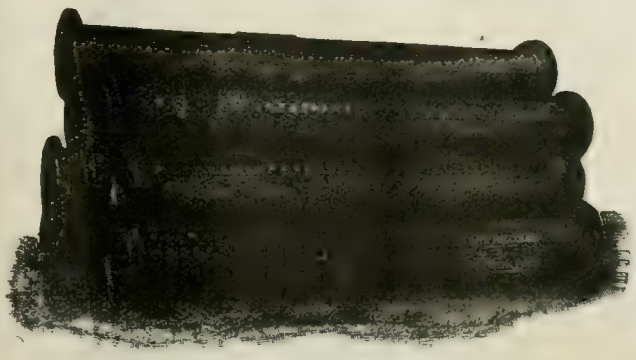
STEEL PIPES

FOR

MAIN STEAM, EXHAUST,

&c.,

For WAR and MERCHANT SHIPS.



SUPPLIED TO BRITISH & FOREIGN NAVIES.

ON ADMIRALTY, BOARD OF TRADE, LLOYDS, —BUREAU VERITAS, AND OTHER LISTS.—

Send your enquiries to—

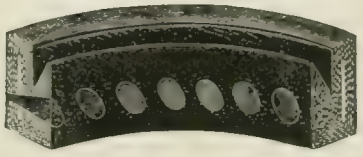
THOMAS PIGGOTT & CO., Ltd.,

BIRMINGHAM.

—— Telegrams: ——
"ATLAS, BIRMINGHAM."

"LION" PATENT PACKINGS

KING OF ALL PACKINGS



AUTOMATIC TYPE FOR WATER.

The ONLY packing that offers at the same time highest packing efficiency and longest wearing quality.

The metal studs inserted at regular intervals form a complete metallic wearing surface that prolongs the life of the packing, reduces friction to the minimum, and prevents scoring of the rod.

The packing is a combination packing, made of finest selected materials, and so constructed as to operate automatically, giving tight packing efficiency with no unnecessary pressure on the rod.

Highest packing efficiency plus longest wearing quality.

Do you realize the value of such a combination in a packing?

BEWARE OF IMITATIONS.

LOOK FOR THE THIN RED LINE.

WRITE FOR CATALOGUE 16.

JAMES WALKER & Co., Ld., Lion Works, Garford Street, West India Dock Rd., LONDON, E.

To face last text.

Under Contract with His Majesty's Government.

P&O and British India Mail & Passenger Services

Frequent and Regular Sailings from LONDON, MARSEILLES, &c.

Tickets Interchangeable. Return Tickets by P. & O. to Ports East of Suez, at a Fare and a Half, available for 24 Months.

MEDITERRANEAN, EGYPT, INDIA, BURMA, STRAITS, CHINA, JAPAN, AUSTRALASIA, MAURITIUS, EAST and SOUTH AFRICA, NEW ZEALAND (via PANAMA CANAL.)

Australian Tickets interchangeable by Orient Line.

For particulars of Sailings apply P. & O. and BRITISH INDIA Passenger Dept., 122, Leadenhall Street, E.C. 3; or 17, Northumberland Avenue, W.C. 2, London.

BRITISH INDIA COMPANY.—For general information apply GRAY, DAWES & Co., 23, Great Winchester Street, E.C.2.

R.M.S.P. & P.S.N.C.

Mail, Passenger & Cargo Services to

SOUTH AMERICA

ARGENTINA, BRAZIL, URUGUAY, CHILE, PERU, AND ECUADOR.

WEST INDIES VIA CANADA.

JAMAICA & PANAMA VIA NEW YORK.

GIBRALTAR, MOROCCO & ATLANTIC IS.

THE ROYAL MAIL STEAM PACKET COMPANY.
THE PACIFIC STEAM NAVIGATION COMPANY.

London: 18, Moorgate St., E.C. 2, and 32, Cockspur St., S.W. 1. Liverpool: 31, James Street.

THE NEW ZEALAND SHIPPING COMPANY

(Incorporated in New Zealand.) LIMITED.

Direct Service of Swift Royal Mail Steamers.

ROUTE: *via* PANAMA CANAL.

These Steamers are particularly adapted for the New Zealand trade, are of the highest class, lighted throughout with electric light, and are fitted with every modern improvement for the safety, comfort, and convenience of passengers. The Mail Steamers are fitted with the Marconi System of Wireless Telegraphy.

Steamers are dispatched every fourth Thursday from London and from New Zealand.

HEAD OFFICES—138, Leadenhall Street, London, E.C.

AND CHRISTCHURCH, NEW ZEALAND.

For Freight and Passage apply to—
J. B. WESTRAY & Co., 138, Leadenhall Street, London, E.C.

GLEN AND SHIRE JOINT SERVICE OF STEAMERS

FROM
Antwerp, Middlesbrough, Hull, London,
DIRECT TO
Penang, Singapore, Hong Kong, Shanghai, Kobe, Yokohama and North Pacific Ports.

TAKING CARGO AT THROUGH RATES TO ALL THE PRINCIPAL DESTINATIONS IN THE FAR EAST.

For freight apply to the Brokers:—
McGREGOR, GOW, HOLLAND, Ltd.,
4, FENCHURCH AVENUE, E.C. 3.
Tel. No. Avenue 4478. Telegraphic Address: "Eastwardly, London."
AND AT MANCHESTER, HULL AND IMMINGHAM.

"SHIRE" LINE STEAMERS.
Owned by
THE ROYAL MAIL STEAM PACKET CO.,
18, Moorgate Street, E.C. 2.
Tel. No. 6460 Wall.
4, Fenchurch Avenue, London, E.C. 3.
Telegraphic Address:—
"Omarishire, London."
Tel. No. 5304-5-6 Avenue.

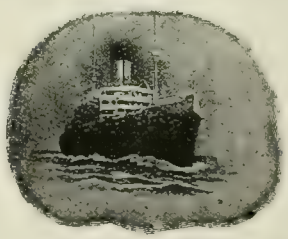
"GLEN" LINE STEAMERS.
For passage apply to the Owners:
GLEN LINE, LTD.,
1, East India Avenue, London, E.C. 3.
Telegraphic Address:—
"Macgregor, London."
Tel. No. 458 Avenue.

PRINCE LINE

REGULAR SERVICES

SOUTH AFRICAN PORTS *from and to* . . . . . NEW YORK
STRAITS, PHILIPPINES, CHINA, JAPAN *from and to* NEW YORK
RIVER PLATE *from* MIDDLESBROUGH, ANTWERP, LONDON and NEW YORK
BRAZILS *from and to* . . . . NEW YORK and RIVER PLATE
NEW ORLEANS *from* . . . . . BRAZILS
U.K. CONTINENT *from* . . . . . NEW ORLEANS
MEDITERRANEAN:—TUNIS, MALTA, ALEXANDRIA, SYRIA,
CYPRUS, LEVANT *from* . . . . . MANCHESTER,
TYNE, MIDDLESBROUGH, ANTWERP and LONDON

For Freight, Passage, and all particulars apply—
PRINCE LINE LTD., 118, Fenchurch Street, London, E.C.
Central Chambers, Brazennose St., Manchester.
Milburn House, Newcastle-on-Tyne.



LAMPORT & HOLT LINE

TO AND FROM

SOUTH AMERICA.

Mail and Passenger Steamers, fortnightly between NEW YORK, BRAZIL and ARGENTINE calling also WEST INDIES (Trinidad and Barbados).

First Class Fast Cargo Steamers (carrying passengers), regular and frequent Sailings from MIDDLESBRO' and LONDON, MANCHESTER, GLASGOW and LIVERPOOL to BAHIA, RIO DE JANEIRO and SANTOS; to MONTE VIDEO and BUENOS AYRES.
From LIVERPOOL and HAVRE, to WEST COAST OF SOUTH AMERICA.
Between NEW YORK and MANCHESTER.

For descriptive Booklets and all particulars apply to:—
LAMPORT & HOLT, LIMITED, ROYAL LIVER BUILDINGS, LIVERPOOL.
Telegrams:—"Lamport."

WEST AND SOUTH-WEST COASTS OF AFRICA, AND THE CANARY ISLANDS.

The Royal Mail Steamers of the

AFRICAN STEAM SHIP CO.

(Incorporated 1852 by Royal Charter) and

THE BRITISH AND AFRICAN STEAM NAVIGATION CO., LTD.,

MAINTAIN REGULAR SAILINGS.
Taking Passengers at Low Rates.

Elder Dempster and Co., Limited,
Head Office—Colonial House, LIVERPOOL.
And at London, E.C., Manchester, Cardiff, Birmingham, Hull, &c.

SHIPOWNERS READ

SHIPBUILDING AND SHIPPING RECORD
A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

BECAUSE

Its Drawings of Ships and Authoritative Articles point out economies in Building, Maintaining and Operating Ships.

ELLERMAN'S CITY & HALL LINES.

LIVERPOOL TO EGYPT & INDIA.

APPLY TO HALL LINE LTD 9, FENCHURCH AVENUE E C LONDON, 3
MONTGOMERIE & WORKMAN LTD 36, GRACECHURCH STREET, E C LONDON
HALL LINE LTD OR ELLERMAN'S CITY LINE AGENCY, 22 WATER STREET, LIVERPOOL
OR TO GEO SMITH & SONS, GLASGOW

NELSON LINES to SOUTH AMERICA.

Fast Weekly Mail Service, LONDON to MONTE VIDEO and BUENOS AIRES.

Cargo carried to these ports, also to Rosario and :: :: Patagonian Ports, via Buenos Aires. :: ::

Cheapest Fares. | Excellent Accommodation.

¶ SPECIAL FREIGHT SERVICE now in operation between LIVERPOOL AND RIVER PLATE.

For full particulars, freight and passage, London Service, and freight only, Liverpool Service, apply

H. & W. NELSON, LTD.,

HEAD OFFICE—98, Leadenhall St., E.C. LIVERPOOL—20, Water St.
WEST END AGENCY—21, Cockspur St. BIRMINGHAM—86, New Street.
MANCHESTER—75, Piccadilly.

NIPPON YUSEN KAISHA

N.Y.K. EUROPEAN SERVICE.

Fortnightly Service to SINGAPORE, HONG KONG, SHANGHAI, KOBE AND YOKOHAMA
(Via Cape of Good Hope).

ALTERNATE SAILINGS FROM EAST AND WEST COASTS.

Apply for date of delivery by land and by water to Freight Dept., 4, Lloyd's Avenue, E.C. 3; or for West Coast Sailings to Alfred Holt & Co., Liverpool.
London Loading berth Royal Albert Dock.
Taking cargo at through rates with transhipment to all coast ports in Far East, also to Vladivostock.

N.Y.K. AUXILIARY SERVICE.

Cargo steamers despatched according to requirements of the trade to usual ports in the Far East. For freight, passage &c., apply at
THE OFFICES OF THE COMPANY, 4, LLOYD'S AVENUE, E.C.
(Telephone 5674 Avenue, 5 lines) or to their Agents.

N.Y.K. NEW YORK—FAR EAST.
VIA PANAMA (or otherwise).

New regular monthly service with specially constructed modern steamers of 10,500 tons deadweight. For freight, &c., apply to :—
THE OFFICES OF THE COMPANY :—4, LLOYD'S AVENUE, **LONDON, E.C.3**;
EQUITABLE BUILDINGS, 120, BROADWAY, **NEW YORK.**

ADOPT LOVERIDGE'S

And they will do you credit!

Tested to 100% overload, without extra.
Screwed rivetted collar, for security.
Superior forged straps, with boss for axle.
Oil reservoir feed, facilitates lubrication.
Flush compact axle, of large bearing.
Anti-chafing shoulders, preserve rope.
Lathe-deepened sheaves, support rope.
Best malleable iron cheeks, light and strong.

Loveridge's Blocks are heavier, stronger and better finished than most others, and cost little, if any, more. List on application.

LOVERIDGE, Ltd., Manufacturing Ship Furnishers, CARDIFF.

SHIP-REPAIRERS · ENGINEERS ·

Royal Liver Building, LIVERPOOL.

Telegraphic Address: "REGULATOR, LIVERPOOL."

Telephone No.: 8800 Bank.

H. & C. GRAYSON, LTD.

Works:
LIVERPOOL: North End—Canada Dock.
South End—Queen's Dock.
GARSTON: Grayson's Dry Dock.
BIRKENHEAD: Graving Dock Works and Grayson's Slipways.

REPAIRS ON THE MERSEY
PNEUMATIC TOOLS, OXY-ACETYLENE AND ELECTRIC WELDING PLANT, PRIVATE DRY DOCK AND SLIPWAYS

HILLS' DRY DOCKS and ENGINEERING CO., LD., CARDIFF.

PNEUMATIC CHIPPING & cleaning a speciality.

Dry Dock Owners (3 Docks), Engineers, Ship Repairers and Ironfounders.

UP-TO-DATE WORKS AND DOCKS.
OXY-ACETYLENE AND ELECTRIC WELDING.
PNEUMATIC TOOLS OF ALL KINDS.

Offices & Works at EAST BUTE DOCK.
Telegrams: "Euclid, Cardiff." Telephone No. 2844.

BROOKE'S Patent VALVE RESEATING MACHINE.

TEL. 2092.

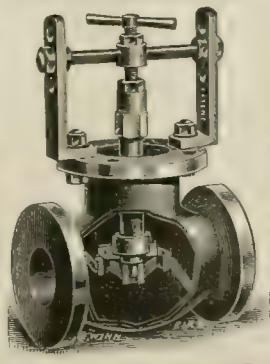
Invaluable to the Mercantile Marine.

No. 1 size covers all requirements on ships.

70 Repeat Orders from one Steamship Firm.

Used by the British and Foreign Governments.

No steamer should be without one.



SPECIAL FEATURES.

Cannot be set out of centre with any seating.

Piston guides in seat ensure perfect uniform width of mitre.

No wondering what it is doing, you can SEE.

Greatest range of any tool on the market.

Built on sound engineering lines. Cannot get out of order. No renewals needed.

FITTED IN POLISHED CASES.

PARTICULARS TO
G. BROOKE, Lloyd's Bank Chambers, Docks, **CARDIFF.**
TELEGRAPHIC ADDRESS: "ORTHO, CARDIFF."

CARDIFF. BARRY. NEWPORT.

DRY DOCK OWNER.

Engineer and Ship Repairer.
Brass and Iron Founder.

Electric and Oxy-Acetylene Welding.

C. H. BAILEY

Works:
Junction Dry Dock & Engineering Co., Ltd., Cardiff.
Branch Works at Barry Dock.

Tubal Cain Foundry and Engineering Works, Cardiff.

Tyne Engine and Ship Repairing Works, Barry Dock.

Tyne Engine and Ship Repairing Works, Newport, Mon.

Telegraphic Addresses:
"BAILEY, CARDIFF."
"BAILEY, BARRY."
"BAILEY, NEWPORT."

THOS. DIAMOND & CO.

CARDIFF.

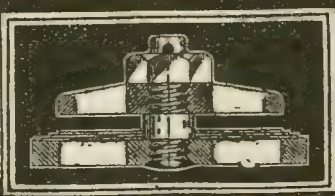
Telegrams: "DECKS, CARDIFF." Telephone: 4746 (Private Branch Exchange).

Engineers, Boilermakers, General Ship Repairers and Boat Builders.

Commercial Dry Dock - - 600 feet × 60 feet.

KINGHORN'S PATENT VALVES

THE BEST VALVE FOR PUMPS OF ALL DESCRIPTIONS ADOPTED UNIVERSALLY AND USED BY 15 ADMIRALTIES.



FITTED TO H.M.S. DREADNOUGHT & SISTER SHIPS & TO THE NEW CUNARD WHITE STAR & OTHER LEADING LINERS.

TELEPHONE 5818 CENTRAL

THE METALLIC VALVE Co
COLONIAL HOUSE, WATER STREET,
LIVERPOOL.

TELEGRAMS: "VALVE"

TRADE MARK.

WALCO

Phone CENTRAL 3305.

Telegrams WALCO. BIRMINGHAM.

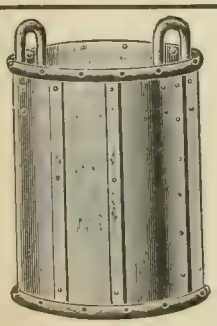
TAPER WASHERS

WHEN SUPPLIES STOP

TRY THE WALCO SERVICE.

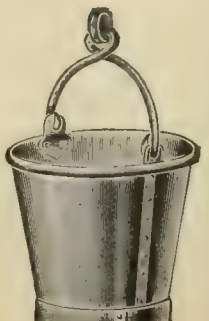
ALL SIZES FROM STOCK.

WALCO LTD., 66, SLANEY STREET, BIRMINGHAM.



STEAMERS' ASH BUCKETS
DRAW BUCKETS

and all kinds of galvanized hollow ware suitable for Shipbuilding and Shipping Trades.



MANUFACTURERS:
HINGLEY & LAMB, LTD.
STOUR WORKS,
LYE.

Cure Leaking Valves
by using the
SIMPLEX PATENT
VALVE-RESEATER.

SELF-CENTREING.
NO GUIDES REQUIRED.
NO STUDS REQUIRED.

WE MAKE OTHER TOOLS OF INTEREST.

Write for List.

BROMELL PATENTS CO., LTD.,
62, ROBERTSON ST., GLASGOW. 12, BATH ST., LIVERPOOL.

BUYERS' GUIDE.

List of the Leading Makers of Shipbuilding and Shipyard and Dock Machinery, Appliances, Plant and Stores.

ACCOMMODATION LADDERS—
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.

AIR COMPRESSORS—
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

AIR PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Ltd., Elgin Works, Clydebank.
George Wright, Etherington Buildings, High Street, Hull.
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.
Mirrlees Watson Co., Ltd., Scotland Street, Glasgow.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

ALUMINIUM CASTINGS—
Britannia Foundry Co., Coventry.

ALUMINIUM GOODS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ALUMINIUM PAINT—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

ANCHORS—
Fellows Bros., Ltd., Clyde Works, Cradley Heath.
Hingley, N., & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Spencer, John, & Sons, Ltd., Steel Works, Newburn-on-Tyne.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

ANTI-CORROSIVE COMPOSITIONS—
Briggs, W., & Sons, Ltd., Dundee.
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FOULING COMPOSITION—
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ANTI-FRICTION METALS—
Billington & Newton, Ltd., Longport, Staffs.
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne.
Delta Metal Co., Ltd., East Greenwich.

ASBESTOS FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ASBESTOS GOODS—
Beldam Packing & Rubber Co., Ltd., 29, Gracechurch Street, London, E.C.
Walker, Jas., & Co., 11, Bishop Court, Anderton, Glasgow.

ASH BINS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.
Wall's Ltd.; Crown Works, Fazeley Street, Birmingham.

ASH DISCHARGING APPLIANCES—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Trewent & Proctor, F. J., Ltd., 43, Billiter Buildings, E.C.

BALANCED WINDOWS—
Beckett, Laycock & Watkinson, Ltd., Willesden Junction, London, N.W.

BARROWS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

BEDDING & NAPERY—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

BEMAL CONDENSER TUBES—
Yorkshire Copper Works, Ltd., Leeds.

BLOWERS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
British Thomson-Houston Co., Ltd., Rugby.
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.

BOILERS—
Central Marine Engine Works, West Hartlepool.
Elliot & Jeffery, East Dock, Cardiff.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland Street, Glasgow.
North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne.
Kincaid, J. G., & Co., Ltd., Greenock.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Rowan, David, & Co., 231, Elliot Street, Glasgow.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., East Cowes, I.W.

BOILER CIRCULATORS—
Brundrit, J., 14, Water Street, Liverpool.

BOILER COVERING—
Newall's Insulation Co., Ltd., Newcastle-on-Tyne.
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

BOILER FEED PUMPS—
Power Plant Co., Ltd., West Drayton, Mx.

BOILER MOUNTINGS—
Cockburns, Ltd., Cardonald, nr. Glasgow
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BOILER PLATES (Steel)—
Leeds Forge Co., Ltd., Leeds.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

BOILER PRESERVATIVE—
Atlas Preservative Co., Ltd., Deptford, S.E.

BOILER TUBES—
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.
Yorkshire Copper Works, Ltd., Leeds.

BOLTS & NUTS—
Bayliss, Jones & Bayliss, Ltd., Victoria Works, Wolverhampton.

BORING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.

BRASS & BRONZE RODS—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Bull's Metal & Melloid Co., Ltd., Yoker, nr. Glasgow.
Delta Metal Co., Ltd., East Greenwich, S.E.
McKechnie Bros., Ltd., Metal Works, Rotton Park Street, Birmingham.

BRASS & COPPER FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS & COPPER RODS—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

BRASS CASTINGS, PLATES, &c.—
Dixon, S., & Sons, Ltd., Leeds.

BRASS FOUNDERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

BRASS FOUNDERS (Plumbers)—
Aston Brass Co. & Whithouse, Ltd., Aston Lane, Birmingham.

BRASS NAME-PLATES—
Metograph Co., 230, Cathedral Street, Glasgow.
Rennie & Co., North Greenhill Road, Paisley.

BRASS TUBES—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Yorkshire Copper Works, Ltd., Leeds.

BRONZE (Manganese)—
Billington & Newton, Ltd., Longport, Staffs.
Birkett, T. M., & Sons, Ltd., Hanley, Staffs.
Bowran, Robt., & Co., Ltd., 4, St. Nicholas Buildings, Newcastle-on-Tyne.
Bull's Metal & Melloid Co., Ltd., Yoker, nr. Glasgow.
Delta Metal Co., Ltd., E. Greenwich, London, S.E.
McKechnie Bros., Ltd., Metal Works, Rotton Park Street, Birmingham.
Stone, J., & Co., Ltd., Deptford, London, S.E.

BRIGHT STEEL—
Hallcross Steel Co., Ltd., Halesowen, nr. Birmingham.

BUCKETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Hingley & Lamb, Ltd., Stour Works, Lye, Worcs.
Wall's Ltd., Crown Works, Fazeley Street, Birmingham.

BULKHEAD INSULATION—
Newall's Insulation Co., Ltd., Newcastle-on-Tyne.

BULKHEADS (Patent)—
Hogg-Car Construction Co., Ltd., Newcastle-on-Tyne.

BUOYANT DECK SEATS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.

BUOYS—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Hingley, N., & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.

CABINET MAKERS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CABLES (Chains)—
Fellows, Bros., Ltd., Clyde Works, Cradley Heath.
Hingley, N., & Sons, Ltd., Netherton Iron Works, Dudley, Staffs.
Sykes, Richard, & Son, Ltd., Cradley Heath.
Taylor, Samuel, & Sons (Brierley Hill), Ltd., Brierley Hill, Staffs.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

CAISSONS & DOCK GATES—
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

CALORIFIERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

CAPSTANS (Electric)—
British Thomson-Houston Co., Ltd., Rugby
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Broadbent, Thomas, & Sons, Central Ironworks, Huddersfield.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
Stothert & Pitt, Ltd., Bath.
Wild, W. B., & Co., Ltd., Nechells, Birmingham.

CARGO BLOCKS—
Higginson & Co., 7, Hurst Street, Liverpool.
Loveridge, Ltd., Docks, Cardiff.

CARPETS—
Stewart, Archibald & Co., 40-48, Union Street, Glasgow.

CASTINGS—
Brown, John, & Co., Atlas Works, Sheffield, and Clydebank, nr. Glasgow.
Darlington Forge Co., Ltd., Darlington.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham.
Goulds' Foundries, Ltd., Cardiff.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

CEMENT—
Aberthaw & Bristol Channel Portland Cement Co., Ltd., Merthyr House, Cardiff.

CIRCULATORS—
Brundrit, J., 14, Water Street, Liverpool.

COAL—
Anglo-Spanish Coaling Co., Ltd., Cambrian Buildings, Cardiff.
Beynon, T., & Co., Ltd., Merthyr House, Cardiff.
Britannic Merthyr Coal Co., Ltd., Cambrian Buildings, Cardiff.
Cambrian Collieries, Ltd., Cambrian Buildings, Cardiff.
Ebbw Vale Steel, Iron & Coal Co., Ltd., Merthyr House, Cardiff.
Glamorgan Coal Co., Ltd., Cambrian Buildings, Cardiff.
Jenkins, Richards & Evans, Ltd., Baltic House, Mount Stuart Square, Cardiff.
Naval Colliery Co. (1897), Ltd., Cambrian Buildings, Cardiff.
Newport Abercarn Black Vein Steam Coal Co., Ltd., Merthyr House, Cardiff.

COAL (*contd.*)—
Powell Duffryn Steam Coal Co., Ltd., Cardiff.
Rhymney Iron Co., Ltd., Merthyr House, Cardiff.

COAL HANDLING PLANT—
Spencer & Co., Ltd., Melksham, Wilts.

COMPASSES (Ship)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Sperry Gyroscope Co., Ltd., 15, Victoria Street, London, S.W.

COMPRESSED AIR HAMMERS—
R. G. Ross & Son, Ltd., Greenhead, Glasgow.

CONDENSERS—
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Dawson & Downie, Ltd., Elgin Works, Clydebank.
Hick, Hargreaves & Co., Ltd., Soho Ironworks, Bolton.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

CONDENSER TUBES (Brass and Copper)—
Yorkshire Copper Works, Ltd., Leeds.

CONTROLLERS & CONTROL GEAR—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

CONVEYORS—
Mather & Platt, Ltd., Manchester.
Spencer & Co., Ltd., Melksham, Wilts.

COOKING APPARATUS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.

COPPER PIPES—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Yorkshire Copper Works, Ltd., Leeds.

COPPERSMITHS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

COPPER TUBES—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Yorkshire Copper Works, Ltd., Leeds.

CORRUGATED IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

COUNTER (Engine)—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

CRAB WINCHES—
Fellows Bros., Ltd., Clyde Works, Cradley Heath.
Holt & Willetts, Cradley Heath.

CRANES (Steam and Electric*)—
*Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
*British Thomson-Houston Co., Ltd., Rugby.
*British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
*Broadbent, Thomas, & Sons, Central Ironworks, Huddersfield.
*Holt & Willetts, Lion Works, Cradley Heath.
*Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.
*Mather & Platt, Ltd., Manchester.
*Ransomes & Rapier, Ltd., 32, Victoria Street, London, S.W.
*Stothert & Pitt, Ltd., Bath

CYLINDERS (Copper)—
Yorkshire Copper Works, Ltd., Leeds.

DELTA METALS—
Delta Metal Co., Delta Works, East Greenwich, S.E.

DERRICKS & DAVITS—
Howden, James, & Co., Ltd., 95, Scotland Street, Glasgow.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.

DIESEL OIL (Mexican)—
Anglo-Mexican Petroleum Co., Ltd., Finsbury Court, E.C.

DIVING APPARATUS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, S.E.

DOCK GATES—
Chalmers, Wm., & Co., Ltd., Rutherglen, nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, L'd, Wallsend-on-Tyne.

DOORS (Watertight)—
British Thomson-Houston Co., Ltd., Rugby.
Stone, J., & Co., Ltd., Deptford, S.E.

DREDGE PLANTS—
Chalmers, Wm., & Co., Ltd., Rutherglen, nr. Glasgow.
Simons, Wm., & Co., Ltd., Renfrew, nr. Glasgow.

DRILLING MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Herbert, Alfred, Ltd., Coventry.
Scott Bros., Keighley
Universal Machinery Corporation, Ltd, 326, Old Street, London, E.C.

DRILLS –
Chatwin, Thos., Ltd., Gt. Tindal Street, Birmingham.

DRILLS (Pneumatic and Electric)—
United States Metallic Packing Co., Ltd., Bradford.

ELECTRIC CRANES (*See* **Cranes**).

ELECTRIC DERRICKS
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRIC DYNAMOS & MOTORS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Crompton & Co., Chelmsford.
Electromotors, Limited, Louisa Street Openshaw, Manchester.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Mawdsley's, Limited, Dursley, Glos.
Phœnix Dynamo Manufacturing Co., Ltd., Bradford.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC FITTINGS—
British Thomson-Houston Co., Ltd., Mazda House, 77, Upper Thames Street, London, E.C.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC HEATING & COOKING APPARATUS—
British Thomson-Houston Co., Ltd., Rugby.
Crompton & Co., Chelmsford.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

ELECTRIC LAMPS—
British Thomson-Houston Co., Ltd., Mazda House, 77, Upper Thames Street, London, E.C.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

ELECTRIC LIGHTING—
Boothroyd, H. T. Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Mazda House, 77, Upper Thames Street, London.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Electromotors, Limited, Louisa Street, Openshaw, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Lister, R. A., & Co., Ltd., Dursley.
Mather & Platt, Ltd., Manchester.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC-LIGHTING PLANT—
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Crompton & Co., Chelmsford.
Electromotors, Limited, Louisa Street Openshaw, Manchester.
Fyfe Wilson & Co., 155a, St. Vincent Street, Glasgow.
Glenifer Motors, Ltd., Temple Works, Anniesland, Glasgow
Greenwood & Batley, Ltd., Albion Works, Leeds.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Mawdsley's, Limited, Dursley, Glos.
Norris, Henty & Gardners, Ltd., 87, Queen Victoria Street, London, E.C.
Petters, Ltd., 73, Queen Victoria Street, London, E.C.
Scott, Jas., Ltd., Bootle, Liverpool.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRIC WIRES—
British Thomson-Houston Co., Ltd., Mazda House, 77, Upper Thames Street, London, E.C.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.

ELECTRICAL CONTRACTORS—
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.

ELECTRICAL CONTRACTORS (*contd*).—
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Martin, W. C., & Co., 10, West Campbell Street, Glasgow.
Mather & Platt, Ltd., Manchester.
Scott, Jas., Ltd., Bootle, Liverpool.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL ENGINEERS—
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Crompton & Co., Chelmsford.
Electromotors, Limited, Louisa Street Openshaw, Manchester
Fyfe Wilson & Co., 155a, St. Vincent Street, Glasgow.
Graham, Alfred, St. Andrew's Works, Crofton Park Road, S.E.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
Mawdsley's, Limited, Dursley, Glos.
Scott, Jas., Ltd., Bootle, Liverpool.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

ELECTRICAL INSTRUMENTS—
(Ammeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Crompton & Co., Chelmsford.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Circuit Breakers) –
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Relays)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road. Newcastle-on-Tyne.

ELECTRICAL INSTRUMENTS (Voltmeters)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Compton & Co., Chelmsford.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

EMERY WHEELS—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

ENAMEL MANUFACTURERS—
Holzapfels, Ltd., Newcastle-on-Tyne.
Websters Ltd., Hull.

ENGINE & DECK STORES—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

ENGINE FITTINGS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

ENGINE-ROOM OUTFITS—
Grieve, T., & Sons, Bedford Street, North Shields.

EVAPORATORS—
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

EXTRUDED METALS (Brass and Bronze)—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
McKechnie Bros., Ltd., Metal Works, Rotton Park Street, Birmingham.

EXTRUDED METALS (Brass, Bronze, Copper, Delta Metals)—
Delta Metal Co., Ltd., E. Greenwich, London, S.E.

FANS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Boothroyd, H. T., Ltd., Bootle, Liverpool.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Electromotors, Limited, Louisa Street, Openshaw, Manchester
Hogan & Wardrop, 2, Gresham Buildings, Basinghall Street, London, E.C.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.
Mawdsley's, Limited, Dursley, Glos.

FEED-WATER HEATERS—
Central Marine Engine Works, West Hartlepool.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Weir, G. & J., Ltd., Cathcart, Glasgow.

FENCING & GATES—
Bayliss, Jones & Bayliss, Ltd., Victoria Works, Wolverhampton.

FILES
Brown, John, & Co., Atlas Works, Sheffield
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

FILTERS (Marine)—
Central Marine Engine Works, West Hartlepool.
Cockburns, Ltd., Cardonald, nr. Glasgow.
Mather & Platt, Ltd., Manchester.

FIREBARS—
Goulds' Foundries, Ltd., Cardiff.

FIRE EXTINGUISHERS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Mather & Platt, Ltd., Manchester.

FLOATING DOCKS—
Chalmers, Wm., & Co., Ltd., Rutherglen, nr. Glasgow.
Hamilton, Wm., & Co., Ltd., Port Glasgow, Scotland.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.

FLOOR COVERING—
Docker Bros., Ltd., Metropolitan Road, Saltley, Birmingham.

FORCED DRAUGHT—
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Howden, J., & Co., Ltd., Scotland Street, Glasgow.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

FORGING PRESSES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Fielding & Platt, Ltd., Atlas Works, Gloucester.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

FORGINGS—
Brown, John & Co., Ltd., Atlas Works, Sheffield.
Cammell Laird & Co., Ltd., Birkenhead.
Darlington Forge Co., Ltd., Darlington.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham.
Hingley, N., & Sons, Ltd., Netherton Iron Works, Staffs.
Richards, Edwin, & Sons, Ltd., Portway Works, Wednesbury.
Sunderland Forge & Engineering Co., Ltd., Sunderland.
Wall's Ltd., Crown Works, Fazeley Street, Birmingham.

FORGINGS (Bronze)—
Delta Metal Co., Delta Works, East Greenwich, London, S.E.

FORGINGS (Steel)—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer John, & Sons, Ltd., Newburn-on-Tyne.
The Midvale Steel Co. of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

FRICTION SURFACES—
Herbert Frood Co., Ltd., The, Chapel-en-le-Frith.

FUEL OIL—
The Anglo-Mexican Petroleum Co., Ltd., Finsbury Court, Finsbury Pavement, E.C.

FUMIGATORS—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

FURNACE BRIDGES—
Goulds' Foundries, Ltd., Cardiff.
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

FURNACES—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Deighton's Patent Flue & Tube Co., Ltd., Vulcan Works, Pepper Road, Leeds.
Leeds Forge Co., Ltd., Leeds.
Piggott, T., & Co., Ltd., Birmingham.

GALLEY GEAR—
Grieve, T. & Sons, Bedford Street, North Shields.

GALVANIZERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
Wall's Ltd., Crown Works, Fazeley Street, Birmingham.

GAS ENGINES—
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Mather & Platt, Ltd., Manchester.
Norris, Henty & Gardners, Ltd., 87, Queen Victoria Street, London, E.C.

GAUGES—
Chatwin, Thos., Ltd., Gt. Tindal Street Birmingham.

GEAR CUTTING—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Wallwork, Henry, & Co., Ltd., Roger Street, Manchester.

GEARING—
British Thomson-Houston Co., Ltd., Rugby.
Brown, David, & Sons, Ltd., Lockwood, Huddersfield

GEARING (*contd.*)—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Lancaster & Tonge, Ltd., Pendleton, Manchester.
Power Plant Co., Ltd., West Drayton, Mx.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Wallwork, Henry, & Co., Ltd., Roger Street, Manchester.

GLASS—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, London, W.

GRAIN DISCHARGING PLANT—
Spencer & Co., Ltd., Melksham, Wilts.

GRINDING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

GRINDING WHEEL MACHINES—
Sterne, L., & Co., Ltd., Crown Iron Works, Glasgow.

HATCH COVERS (Patent)—
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.

HAWSERS—
Brown, W. B., & Co. (Bankhall), Ltd., Globe Works, Bankhall, Liverpool.
Newall, R. S. & Son, Ltd., Linacre, Liverpool.

HEATING APPARATUS—
Low, Archibald, & Sons. Ltd., 78, Merkland Street, Partick, Glasgow.
Thermotank Co., 55, West Regent Street, Glasgow.

HELM SIGNAL TELEMOTORS—
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

HIGH SPEED DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.

HIGH SPEED STEEL—
Brown, John, & Co., Atlas Works, Sheffield.

HOISTS—
Mather & Platt, Ltd., Manchester.
Stothert & Pitt, Ltd., Bath.

HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

HYDRAULIC CRANES—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

HYDRAULIC MACHINERY—
Berry, Henry, & Co., Ltd., Croydon Works, Leeds.
Fielding & Platt, Ltd., Atlas Works, Gloucester.

HYDRANTS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

INDIARUBBER—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

INDUCED DRAUGHT—
Davidson & Co., Ltd., Sirocco Engineering Works, Belfast.
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

INSULATING MATERIAL—
J. D. Insulating & Refrigerating Co., 3, Cook Street, Liverpool.
Newall's Insulation Co., Ltd., Newcastle-on-Tyne.

INSULATIONS—
J.D. Insulating & Refrigerating Co., 3, Cook Street, Liverpool.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.

IRON ROOFS AND BUILDINGS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

JOINTING MATERIALS—
The Beldam Packing & Rubber Co., Ltd., 29, Gracechurch Street, E.C.
House, Fredk. & Co., 6*, Falkner Street, Liverpool.
Ferguson & Timpson, Ltd, 50, Wellington Street, Glasgow.

JOINTING MATERIAL (Manganesite)—
Hudson & Co.'s Successors, John, 15, Victoria Warehouses, Mansell St., E.C.

LAMPS AND LIGHTS—
Grieve, T., & Sons, Bedford Street, North Shields.
Kaye, Joseph, & Sons, Ltd., Leeds.

LATHES—
Herbert, Alfred, Ltd., Coventry.
Scott Bros., Keighley.
Universal Machinery Corporation, Ltd., 326, Old Street, London, E.C.

LAUNCHES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Livingstone & Cooper, Ltd., Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

LAVATORY FITTINGS AND APPLIANCES—
Levick, John, Ltd., Alma Street, Aston, Birmingham.
Wall's Ltd., Crown Works, Fazeley Street, Birmingham.

LEAD (Sheets and Pipes)—
Rimer Bros., Newcastle-on-Tyne.

LEAD (White and Red)—
Rimer Bros., Newcastle-on-Tyne.

LIFEBOATS—
British Marine Motor & Launch Co., Ltd., Whitcinch, Glasgow.

LIFTS AND HOISTS—
Holt & Willetts, Lion Works, Cradley Heath.
Maetaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

LIGHTERS—
Chalmers, Wm., & Co., Ltd., Ruthergien, nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

LOCKS—
Kaye, Joseph, & Sons, Ltd., Leeds.

LOCOMOTIVE TUBES (Copper and Brass)—
Yorkshire Copper Works, Ltd., Leeds.

LOCOMOTIVE TUBES (Iron & Steel)—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.

LUBRICATORS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

MACHINE TOOLS—
Bliss, E. W., Co., 1A, Pocock Street, Blackfriars Road, London, S.E.
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.
Greenwood & Batley, Ltd., Albion Works, Leeds.
Fielding & Platt, Ltd., Atlas Works, Gloucester.
Herbert, Alfred, Ltd., Coventry.
Scott Bros, Keighley
Scriven & Co., Leeds Old Foundry, Leeds.
Universal Machinery Corporation, Ltd., 326, Old Street, London, E.C
Wallwork, Henry, & Co., Ltd., Roger Street, Manchester.

MAGNESIA—
Newall's Insulation Co., Ltd., Newcastle-on-Tyne.

MARINE ENGINE BUILDERS AND REPAIRERS—
Alison, J. Gordon, & Co., Ltd., Dock Engine Works, Birkenhead.
Bailey, C. H., Newport, Mon.
Barry Graving Dock & Engineering Co., Ltd., Barry Docks.
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Ljungstrom Marine Turbine Co., Ltd., 22, Billiter Street, London, E.C.
Brown, John, & Co., Ltd., Clydebank, nr. Glasgow.
Central Marine Engine Works, West Hartlepool.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffery, East Dock, Cardiff.
Gleniffer Motors, Ltd., Temple Works, Anniesland, Glasgow.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Ltd., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Kincaid, J. G., & Co., Ltd., Greenock.
Laing, Sir James & Sons, Ltd., Deptford Yard, Sunderland.
Livingstone & Cooper, Ltd., Hessle, Hull.
Mordey, Carney & Co., Ltd., Newport, Mon.
Mountstuart Dry Docks, Ltd., Cardiff.
North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Petters, Ltd., 73, Queen Victoria Street, London, E.C.
Richardsons, Westgarth & Co., Ltd., Hartlepool, Middlesbrough and Sunderland.
Rowan, David, & Co., 231, Elliot Street, Glasgow.
Shearman, John, & Co., Ltd., Cardiff.
Short Bros., Ltd., Pallion Shipyard, Sunderland.
Simons, Wm., & Co., Ltd., Renfrew, nr. Scotland.
Societe Marseillaise de Constructions Mecaniques, Marseilles, France.
Stephen, Alex, & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
Thompson, Joseph, & Sons, Ltd., Sunderland.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.

MARINE ENGINE BUILDERS AND REPAIRERS (*contd.*)—
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

MARKING-OFF TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

MATTRESSES—
Atlas Co., Ltd., Atlas Works, Bilston.
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Whitfields Bedsteads, Ltd., 109-125, Watery Lane, Bordesley, Birmingham.

MECHANICAL LEATHERS—
Walco Ltd., 66, Slaney Street, Birmingham.

MECHANICAL STOKERS—
Alison, J. Gordon, & Co., Ltd., Dock Engine Works, Birkenhead.

METALLIC PACKING—
Aston Chain & Hook Co., Ltd., Erdington, Birmingham.
Beldam Packing & Rubber Co., Ltd., 1 and 2, Gracechurch Street, London, E.C.
Lancaster & Tonge, Ltd., Pendleton, Manchester.
United States Metallic Packing Co., Ltd., Bradford.

METAL SPINNINGS—
Levick, John, Ltd., Alma Street, Aston, Birmingham.

METALS (Patent)—
Bowran, Robt., & Co., Ltd., Newcastle-on-Tyne
Delta Metal Co., Ltd., Delta Works, East Greenwich.

MEXICAN FUEL OIL—
Anglo-Mexican Petroleum Co., Ltd., Finsbury Court, Finsbury Pavement, E.C.

MILLING MACHINES—
Herbert, Alfred, Ltd., Coventry.

MOTOR BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Gleniffer Motors, Ltd., Temple Works, Anniesland, Glasgow.
Livingstone & Cooper, Ltd., Hessle, Hull.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Seamless Steel Boat Co., Ltd., Wakefield.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, London, S.W.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

MOTOR STARTING AND CONTROL GEAR—
British Thomson-Houston Co., Ltd., Rugby.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

MOULDING MACHINES—
Britannia Foundry Co., Coventry.

NAVAL ARCHITECTS' SUPPLIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

OIL CANS—
Kaye, Joseph, & Sons, Ltd., Leeds.
Valor Co., Ltd., Rocky Lane, Aston Cross, Birmingham.

OIL ECONOMISERS—
Kaye, Joseph, & Sons, Ltd., Leeds.

OIL ENGINES—
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Fyfe Wilson & Co., 155a, St. Vincent Street, Glasgow.
Gleniffer Motors, Ltd., Temple Works, Anniesland, Glasgow.
Norris, Henty & Gardners, Ltd., 87, Queen Victoria Street, London, E.C.
North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne and Sunderland.
Perman & Co., Ltd., 82-83, Fenchurch Street, E.C.
Petters, Ltd., 73, Queen Victoria Street, London, E.C.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
Wallsend Slipway and Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL FILTERS—
Valor Co., Ltd., Rocky Lane, Aston Cross, Birmingham.

OIL & GREASE LUBRICANTS—
Rimer Bros., Milburn House, Newcastle-on-Tyne.

OIL FUEL—
Anglo-Mexican Petroleum Co., Ltd., Finsbury Court, Finsbury Pavement, E.C.

OIL-FUEL INSTALLATION—
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.

OIL IMPORTERS & BLENDERS—
Rimer Bros., Newcastle-on-Tyne.

OIL STORAGE CABINETS—
Valor Co., Ltd., Rocky Lane, Aston Cross, Birmingham.

PACKING (Engine)—
Beldam Packing & Rubber Co., Ltd., 20, Gracechurch Street, London, E.C.
Ferguson & Timpson, Ltd., 50, Wellington Street, Glasgow.
Walker, Jas., & Co., Ltd., Lion Works, Garford Street, West India Dock Road, E.

PAINTS—
Briggs, W., & Sons, Ltd., Dundee.
Hamilton, Archd. H., & Co., Possilpark, Glasgow.
Websters, Ltd., Hull.

PANELLING—
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.

PATENT HAWSE PIPE AND DECK FLANGE—
Hamilton, A., & Sons, 13, Bute Crescent, Docks, Cardiff.

PERFORATED METALS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Piggott, T., & Co., Ltd., Birmingham.

PIPES—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

PISTONS—
Lancaster & Tonge, Ltd., Pendleton, Manchester.

PLANING MACHINES for Plate Edges—
Bliss, E. W., Co., 1a, Pocock Street, Blackfriars Road, London, S.E.
Scriven & Co., Leeds Old Foundry, Leeds.

PLATE BENDING ROLLS—
Bliss, E. W., Co., Pocock Street, Blackfriars Road, S.E.
Scriven & Co., Leeds Old Foundry, Leeds.

PORCELAIN ENAMELLED CAST IRON—
Levick, John, Ltd., Alma Street, Aston, Birmingham, Liverpool.

PROPELLERS—
Bull's Metal & Melloid Co., Ltd., Yoker, nr. Glasgow.
Crichton, C. & H., Ltd., Huskisson Engine Works.
Darlington Forge Co., Ltd., Darlington.
Goulds' Foundries, Ltd., Cardiff.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.

PROPELLER BLADES—
Darlington Forge Co., Ltd., Darlington.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.

PULLEY BLOCKS—
Fellows Bros., Clyde Works, Cradley Heath.
Higginson & Co., 7, Hurst Street, Liverpool.
Holt & Willetts, Lion Works, Cradley Heath.
Loveridge, Ltd., Cardiff.
Wright, Joseph, & Co., Ltd., Tipton, Staffs.

PUMPS—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Berry Henry, & Co., Ltd., Croydon Works, Leeds.
Central Marine Engine Works, West Hartlepool.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Dawson & Downie, Ltd., Elgin Works, Clydebank.
Fielding & Platt, Ltd., Atlas Works, Gloucester.
George Wright, Etherington Buildings, High Street, Hull.
Hall, J. P., & Sons, Ltd., Peterborough.
Mather & Platt, Ltd., Manchester.
Weir, G. & J., Ltd., Cathcart, Glasgow.

PUNCHING AND SHEARING MACHINES—
Bliss, E. W., Co., Pocock Street, Blackfriars, Road, S.E.
Fielding & Platt, Ltd., Atlas Works, Gloucester.
Scriven & Co., Leeds Old Foundry, Leeds.

PYROMETERS—
Cambridge Scientific Instrument Co., Ltd., Cambridge.

RADIATORS—
British Thomson-Houston Co., Ltd., Rugby.
Low, Archibald & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

RADIATOR TUBES—
Yorkshire Copper Works, Ltd., Leeds.

REAMERS—
Chatwin, Thos., Ltd., Gt. Tindal Street, Birmingham.

REFRIGERATING MACHINERY—
Hall, J. & E., Ltd., Dartford Ironworks, Kent.
Liverpool Refrigeration Co., Ltd., Colonial House, Liverpool.
Sterne, L., & Co., Ltd., Crown Ironworks, Glasgow.

REVERSING ENGINES (Direct-Acting Type)—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

RHEOSTATS & RESISTANCES (all kinds)—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne

RIGGING ROPES—
Newall, R. S., & Son, Ltd., Linacre, Liverpool.

RIGGING SCREWS—
Fellows Bros., Clyde Works, Cradley Heath.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.

ROPES—
Brown, W. B., & Co (Barkhall), Ltd., Globe Works, Bankhall, Liverpool.

ROUND AND OVAL HOLE CUTTING-OUT MACHINES—
Campbells & Hunter Ltd., Dolphin Foundry, Leeds.

RUBBER GOODS—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER HOSE—
Heinke, C. E., & Co., 88, 89, Grange Road, Bermondsey, London, S.E.

RUBBER STAIR CARPET—
Goudie, James T., & Co., Ltd., 49, Queen Street, Glasgow.

RUBBER TILING—
Goudie, James T., & Co., Ltd., 49, Queen Street, Glasgow.

RUSTLESS IRON—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SAFETY GLASS—
Triplex Safety Glass Co., Ltd., 1, Albemarle Street, London, W.

SALOON LIGHTS—
Beckett, Laycock & Watkinson, Ltd., Willesden Junction, London, N.W.

SANITARY FITTINGS AND APPLIANCES—
Levick, John, Alma Street, Aston, Birmingham.

SCREWING MACHINES.
Chatwin, Thos., Ltd., Gt. Tindal Street, Birmingham.

SCREWS—
Bayliss, Jones & Bayliss, Ltd., Victoria Works, Wolverhampton.

SEARCHLIGHT PROJECTORS—
Crompton & Co., Ltd., Chelmsford.

SHAFTING—
Brown, John, & Co., Ltd., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Halesowen Steel Co., Ltd., Halesowen, nr. Birmingham.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

SHAPING MACHINES—
Greenwood & Batley, Ltd., Albion Works, Leeds.

SHEAVES—
Higginson & Co., 7, Hurst Street, Liverpool.

SHEERS, TRAVERSING (Land and Floating)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.

SHEET STEEL FITTINGS—
Walls, Ltd., Crown Works, Fazeley Street, Birmingham.

SHIP APPLIANCES—
Linkletter's Patent Ship Fittings Co., 20, Percy Street, Tynemouth.

SHIP BROKERS—
Cairns, Noble & Co., Ltd., Newcastle-on-Tyne.
Jenkins, Richards & Evans, Ltd., Baltic House, Mount Stewart Square, Cardiff
Walford, Leopold (London), Ltd., 29, Gt. St. Helens, E.C.

SHIP BROKERS (Sale and Purchase)—
Pinkney, Thos., & Sons, Sunderland.
Walford, Leopold (London), Ltd., 29, Gt. St. Helens, E.C.

SHIPBUILDERS—
Ardrossan Dry Dock & Shipbuilding Co., Ltd., Ardrossan.
Brown, John, & Co., Ltd., Clydebank, nr. Glasgow.
Chalmers, W., & Co., Ltd., Ruthergien, nr. Glasgow.
Crichton, J., & Co., Saltney Shipyard, Chester.

SHIPBUILDERS (*contd.*)—
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Doxford, Wm., & Sons, Ltd., Sunderland.
Gray, Wm., & Co., Ltd., West Hartlepool.
Hamilton, Wm., & Co., Ltd., Port Glasgow.
Harland & Wolff, Ltd., Belfast.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Laing, Sir James, & Sons, Ltd., Deptford Yard, Sunderland.
Livingstone & Cooper, Ltd., Hessle, Hull.
Short Bros., Ltd., Pallion Shipyard, Sunderland.
Simons, Wm., & Co., Ltd., Renfrew, nr. Scotland.
Societe Marseillaise de Constructions Mecaniques, Marseilles, France.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow.
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thompson, Joseph, & Sons, Ltd., Sunderland.
Thornycroft, John I., & Co., Ltd., Caxton House, Westminster, S.W.
Watson, J. S., Gainsborough.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman Clark & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

SHIP CONSTRUCTION—
Brown, John, & Co., Ltd., Clydebank, nr. Glasgow.
Hogg-Carr Construction Co., Ltd., Newcastle-on-Tyne.
Isherwood, J. W., 4, Lloyd's Avenue, London, E.C.
Simons, Wm., & Co., Ltd., Renfrew, nr. Scotland.
Swan, Hunter, & Wigham Richardson, Ltd., and Maxwell Ballard, Wallsend Shipyard, Wallsend-on-Tyne.

SHIP FURNISHING & FITTINGS—
Linkleter's Patent Ship Fittings Co., Hudson Street, North Shields.
Loveridge, Ltd., Cardiff.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.
Waring & Gillow, Ltd., 164-180, Oxford Street, London, W.

SHIP LAVATORIES—
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.

SHIPPING TACKLE—
Shaw, H. F., Old Hill, Staffs.

SHIP PLATES (Steel)—
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

SHIP REPAIRERS—
Alison, J. Gordon, & Co., Ltd., Dock Engine Works, Birkenhead.
Ardrossan Dry Dock & Shipbuilding Co., Ltd., Ardrossan.
Atlantic Coaling Co., Ltd., 36, Leadenhall Street, London, E.C.
Bailey, C. H., Newport, Mon.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Day, Summers & Co., Ltd., Northam Ironworks, Southampton.
Diamond, Thos., & Co., Cardiff.
Doxford, Wm., & Sons, Ltd., Sunderland.
Elliott & Jeffrey, East Dock, Cardiff.
Gray, Wm., & Co., Ltd., West Hartlepool.
Grayson, H. & C., Ltd., Royal Liver Building, Liverpool.
Harland & Wolff, Ltd., Belfast.
Harris Bros., Cambrian Dry Docks, Swansea.
Hawthorn, R. & W., Leslie & Co., Ltd., Hebburn-on-Tyne.
Hill's Dry Docks & Engineering Co., Ltd., Cardiff.
Laing, Sir James, & Sons, Ltd., Deptford Yard, Sunderland.
Mordey, Carney & Co., Ltd., Newport, Mon.
Mountstuart Dry Docks, Ltd., Cardiff.
Shearman, John, & Co., Ltd., Cardiff.
Short Bros., Ltd., Pallion Shipyard, Sunderland.
Societe Marseillaise de Constructions Mecaniques, Marseilles, France.
Stephen, Alex., & Sons, Ltd., Linthouse, Govan, Glasgow
Swan, Hunter, & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thompson, Joseph, & Sons, Ltd., Sunderland.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
Yarrow & Co., Ltd., Glasgow.

SHIPS' BERTHS—
Atlas Co., Ltd., Atlas Works, Bilston.
Beckett, Laycock & Watkinson, Ltd., Willesden Junction, London, N.W.
Whitfields Bedsteads, Ltd., Watery Lane, Birmingham.

SHIPS' TELEGRAPHS—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

SIGNAL FLASHING AND CABIN LAMPS—
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow

SILICATE-COTTON SPECIALITIES—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

SKYLIGHT & LIFTING GEARS—
Low, Archibald & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

SMITHS' HEARTHS—
Keith, James, & Blackman Co., Ltd., 27, Farringdon Avenue, London, E.C.

SOLDER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPELTER—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SPIRAL SPRINGS—
Cockburns, Ltd., Cardonald, nr. Glasgow.
Sterne, L., & Co., Ltd., Crown IronWorks, Glasgow.

STAMPINGS—
Delta Metal Co., Ltd., East Greenwich.
Wall's Ltd., Crown Works, Fazeley Street, Birmingham.

STANCHIONS—
Richards, Edwin & Sons, Ltd., Portway Works, Wednesbury.

STAYBOLTS—
Hingley & Son, Ltd., Netherton Iron, Works, Dudley, Staffs.
Richards, Edwin & Sons, Ltd., Portway Works, Wednesbury.

STEAM FITTINGS—
Dixon, S., & Sons, Ltd., Leeds.

STEAM HAMMERS—
Ross, R. G., & Son, Ltd., Greenhead, Glasgow.

STEAM-HEATING—
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.

STEAM PIPES—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

STEAM TRAPS—
Cockburns, Ltd., Cardonald, nr. Glasgow.
Lancaster & Tonge, Ltd., Pendleton, Manchester.

STEAMSHIP SPECIALITIES—
Beckett, Laycock & Watkinson, Ltd., Willesden Junction, London, N.W.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

STEEL—
Brown, John & Co., Atlas Works, Sheffield.
Halesowen Steel Co., Ltd., Halesowen, nr. Birmingham.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

STEEL BARGES—
Crichton, J., & Co., Saltney Shipyard, Chester.
Watson, J. S., Gainsborough.

STEEL BOATS—
Crichton, J., & Co., Saltney Shipyard, Chester.
Seamless Steel Boat Co., Ltd., Wakefield.

STEEL FURNITURE—
Crittall Steel Furniture Co., Ltd., Braintree, Essex.

STEEL MAKERS—
Brown, John, & Co., Atlas Works, Sheffield.
Darlington Forge Co., Ltd., Darlington.
Spencer, John, & Sons, Ltd., Newburn-on-Tyne.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria St., S.W.

STEEL PLATES AND SHEETS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.

STEERING GEAR—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Donkin & Co., Walker Gate, Newcastle-on-Tyne.
Harfield & Co., Blaydon Ironworks, Newcastle-on-Tyne.
Higginson & Co., 7, Hurst St., Liverpool.

STEERING GEAR (Buffers)—
Donkin & Co., Walker Gate, Newcastle-on-Tyne.
Loveridge, Ltd., Cardiff.

STEERING TELEMOTORS—
Brown Brothers & Co., Ltd., Rosebank Iron Works, Edinburgh.
Donkin & Co., Walker Gate, Newcastle-on-Tyne.
Mactaggart, Scott & Co., Ltd., Loanhead, Edinburgh.

STOCKS AND DIES—
Chatwin, Thos., Ltd., Gt. Tindal Street, Birmingham.

STORAGE BINS—
Crittall Steel Furniture Co., Ltd., Braintree, Essex.

STORES (Ship)—
Walker, Jas., & Co., 11, Bishop Court, Anderston, Glasgow.

STRUCTURAL ENGINEERS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.

SUPERHEATERS—
Central Marine Engine Works, West Hartlepool.
Superheater Corporation, Ltd., Palace Chambers, 9, Bridge Street, Westminster, S.W. (Robinson System.)

SUSPENSION BULB FURNACE—
Leeds Forge Co., Ltd., Leeds.

SWITCHBOARDS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.
Mather & Platt, Ltd., Manchester.
McGeoch Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.
Sunderland Forge & Engineering Co., Ltd., Sunderland.

SWITCHGEAR & INSTRUMENTS—
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Holmes, J. H., & Co., Portland Road, Newcastle-on-Tyne.

SYRENS—
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.

TANKS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Mather & Platt, Ltd., Manchester.
Wall's Ltd., Crown Works, Fazeley Street, Birmngham.

TELEPHONES—
Graham, Alfred, St. Andrew's Works, Crofton Park Road S.E.
McGeoch, Wm., & Co., Ltd., 28, West Campbell Street, Glasgow.

THERMOMETERS—
Cambridge Scientific Instrument Co., Ltd., Cambridge.

TEMPERATURE BALANCE—
Brundrit, J., 14, Water Street, Liverpool.

TIMEPIECES—
Chadburn's (Ship) Telegraph Co., Ltd., Cyprus Road, Bootle, Lancs.

TIME RECORDERS—
Gledhill-Brook Time Recorders, Ltd., 43, Market Street, Huddersfield.

TOOL STEEL—
Brown, John, & Co., Atlas Works, Sheffield.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria Street, S.W.

TUBE PLATE CUTTING-OUT MACHINES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

TUBES—
Dixon, S., & Sons, Ltd., Leeds.
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham.
Royles, Ltd., Irlam, nr. Manchester.
Scottish Tube Co., Ltd., 34, Robertson Street, Glasgow.
Stewarts & Lloyds, Ltd., 41, Oswald Street, Glasgow.
Yorkshire Copper Works, Ltd., Leeds.

TUBES (Brass and Copper)—
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
Yorkshire Copper Works, Ltd., Leeds.

TURBINE BLADING—
Aston Chain & Hook Co., Ltd., Erdington, Birmingham.
Bolton, Thos., & Sons, Ltd., 57, Bishopsgate, E.C.
The Midvale Steel Co., of Philadelphia and London, Ltd., 26, Victoria St., S.W.

TURBINE OIL—
Rimer Bros., Newcastle-on-Tyne.

TURBINES (Auxiliary)—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Belliss & Morcom, Ltd., Ledsam Street Works, Birmingham.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Greenwood & Batley, Ltd., Albion Works, Leeds.

TURBINES (Auxiliary) (*contd.*)—
Howden, James, & Co., Ltd., 195, Scotland Street, Glasgow.
Mather & Platt, Ltd., Manchester.

TURBINES (Propulsive)—
British Ljungstrom Marine Turbine Co., Ltd., 22, Billiter Street, London, E.C.
British Thomson-Houston Co., Ltd., Rugby.
British Westinghouse Electric & Mfg. Co., Ltd., Trafford Park, Manchester.
Brown, John, & Co., Ltd., Clydebank, nr. Glasgow.
Gray, Wm., & Co., Ltd., West Hartlepool.
Harland & Wolff, Ltd., Belfast.
Hawthorn, R. & W., Leslie & Co., Ltd., St. Peter's, Newcastle-on-Tyne.
Howden, James, & Co., Ltd., Scotland Street, Glasgow.
North Eastern Marine Engineering Co., Ltd., Wallsend-on-Tyne and Sunderland.
Richardsons, Westgarth & Co., Ltd., Hartlepool.
Rowan, David, & Co., 231, Elliott Street, Glasgow.
Swan, Hunter & Wigham Richardson, Ltd., Wallsend-on-Tyne.
Thornycroft, J. I., & Co., Ltd., Caxton House, Westminster.
Wallsend Slipway & Engineering Co., Ltd., Wallsend-on-Tyne.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Workman, Clark, & Co., Ltd., Belfast.
Yarrow & Co., Ltd., Glasgow.

TURBO-ELECTRIC PROPULSION—
British Ljungstrom Marine Turbine Co., Ltd., 22, Billiter Street, London, E.C.

TWIST DRILLS—
Brown, John, & Co., Atlas Works, Sheffield.
Chatwin, Thos., Ltd., Gt. Tindal Street, Birmingham.
The Sheffield Twist Drill & Steel Co., Ltd., Sheffield.

UPHOLSTERERS—
Stewart, Archibald, & Co., 40-48, Union Street, Glasgow.

VALVES—
Cockburns Ltd., Cardonald, nr. Glasgow.
Dixon, S., & Sons, Ltd., Leeds.
Mather & Platt, Ltd., Manchester.
McRobie, John, & Sons, 94, Elliott Street, Cranstonhill, Glasgow.
Metallic Valve Co., Colonial House, Water Street, Liverpool.

VALVE RE-SEATER—
Bromell Patents Co., Ltd., 62, Robertson Street, Glasgow.
Brooke, G., Lloyds Bank Chambers, Docks, Cardiff.
Greenwood & Batley, Ltd., Albion Works, Leeds.

VENTILATORS—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.
Grieve, T., & Sons, Bedford Street, North Shields.
Laycock, W. S., Ltd., Victoria Works, Millhouses, Sheffield.
Loveridge, Ltd., Cardiff.
Low, Archibald, & Sons, Ltd., 78, Merkland Street, Partick, Glasgow.
Thermotank Co., 55, West Regent Street, Glasgow.

WASHERS—
Walco Ltd., 66, Slaney Street, Birmingham.

WELDING & CUTTING—
Evans, Joseph, & Co., Ltd., Liverpool Street Mills, Birmingham.

WINCHES—
Allen, W. H., Son & Co., Ltd., Queen's Engineering Works, Bedford.
Broadbent, Thomas, & Sons, Central Ironworks, Huddersfield.
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Clarke, Chapman & Co., Ltd., Gateshead-on-Tyne.
Higginson & Co., 7, Hurst Street, Liverpool.
Holt & Willetts, Lion Works, Cradley Heath.
Petters, Ltd., 73, Queen Victoria Street, London, E.C.
Sunderland Forge & Engineering Co., Ltd., Sunderland.
Wild, W. B., & Co., Ltd., Nechells, Birmingham.

WINDLASSES—
Crichton, C. & H., Ltd., Huskisson Engine Works, Liverpool.
Harfield & Co., Blaydon Iron Works, Newcastle-on-Tyne.

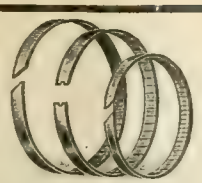
WIRE ROPES—
Brown, W. B., & Co. (Bankhall), Ltd., Globe Works, Bankhall, Liverpool.
Excelsior Wire Rope Co., Ltd., Cardiff.
Newall, R. S., & Son, Ltd. Linacre, Liverpool.

WORK TABLES—
Campbells & Hunter, Ltd., Dolphin Foundry, Leeds.

WORM GEARS—
Brown, David, & Sons, Ltd., Lockwood, Huddersfield.
Wallwork, Henry, & Co., Ltd., Roger Street, Manchester.

YACHT BUILDERS—
Crichton, J., & Co., Saltney Shipyard, Chester.
White, J. Samuel, & Co., Ltd., East Cowes, I.W.
Yarrow & Co., Ltd., Glasgow.

ZINC—
Braby, F., & Co., Ltd., Eclipse Works, Glasgow.



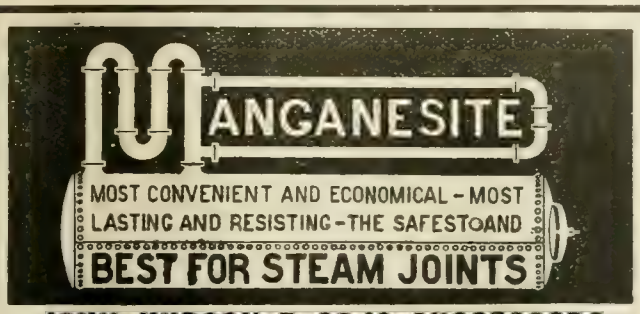
HAMMERED CAST IRON PISTON RINGS

(By the Davy Robertson Process). All sizes from 2½ in. to 72 in. in our SPECIAL PISTON RING IRON

THE STANDARD PISTON RING & ENGINEERING CO. LTD., *Premier Works,* DON ROAD, SHEFFIELD.

WIRE ROPES

W. B. BROWN & CO. (BANKHALL) Ltd. BANKHALL, LIVERPOOL.



JOHN HUDSON & CO.'S SUCCESSORS
15, VICTORIA WAREHOUSES, MANSELL STREET, LONDON, E.

SOCIETE MARSEILLAISE DE CONSTRUCTIONS MECANIQUES
(Established 1850) *Telegrams: "Mecanique-Marseille."*
MARSEILLES
Shipbuilding & Repairing Works
VESSELS UP TO 650 FEET IN LENGTH DOCKED & PAINTED AT SHORTEST NOTICE.
Engine and Boiler Makers, Coppersmiths, Forgemasters, Founders, Oxy-Acetylene Welding, Appliances for boring Cylinders in position, Joinery Work. All latest appliances for quick dispatch. Complete plant for dealing with Electric Light and Wireless Installations.

Agent for Clyde District:—Mr. Louis M. Miller, 166, Buchanan Street, Glasgow
" " Tyne and N.E. District:—Mr. John W. Morley, Bolbec Hall, Newcastle-on-Tyne.
" " Liverpool District:—Mr. C. Payant, 1, Thomas Street, Liverpool.
THE ATLAS COMPANY, LTD.
ATLAS WORKS - - - - BILSTON.
Latest and Most Modern Styles of
SHIPS' COT-BEDS, BERTHS & FITTINGS
For Every Description of Accommodation.
Cables, Letters and Telegrams: "Atlas, Bilston." Telephones (2 lines) 8 and 51 Bilston.

LARGEST DRY DOCKS IN THE BRISTOL CHANNEL.
BARRY GRAVING DOCK & ENGINEERING CO., LTD.
Best facilities for Dispatch of Repairs of every description.
Telegrams: "BARDOCK, BARRY." Telephones { No. 290 BARRY (5 lines.) / No. 7 BARRY (night calls.)

FOR
MOULDING MACHINES
Britannia Foundry Company, Coventry.

JOHN SHEARMAN & CO., LIMITED
CARDIFF. BARRY. NEWPORT. AVONMOUTH.
UP-TO-DATE PLANTS FOR QUICK REPAIRS
—PNEUMATIC AND ELECTRIC DRILLS—
Dry Docks for { Barry - 4 Steamers, Cardiff - 2 ,, } Avonmouth - 2 Steamers, Newport - 2 ,, Telegrams: (each place) "Shearman."

WALL'S LTD., CROWN WORKS, FAZELEY ST., **BIRMINGHAM**
SPECIALISTS IN
SHEET STEEL FITTINGS
FOR WARSHIPS, MAIL STEAMERS, CARGO VESSELS.
Contractors to Admiralty, Colonial and Foreign Governments.
Telegrams: "Exmetcon," Birmingham. *See displayed Advt. next week.*

CHAS. J. KERMAN & CO., WEST BUTE ST. CARDIFF.
Telegrams—"Universal, Cardiff." *Telephone Nos. 4312 & 4318.*
SPECIALITIES:
India Rubber, Asbestos, and Steam Packings of every description.
Marine Boiler and Stay Tubes. W.I. Piping and Fittings.
Stone's Genuine "Navy" White Bronze.
Steamship, Colliery and Engineers' Furnishers.
Byers' Stockless Anchors, as used by British and Foreign Navies.
Brass and Wood Condenser Ferrules.

DAWSON & DOWNIE, LTD.
CLYDEBANK.
PUMPS FOR MARINE INSTALLATIONS.
PATENT DIRECT-ACTING FEED & SERVICE PUMPS.
IMPROVED VERTICAL DUPLEX PUMPS.

BUOYANT DECK SEATS.
Approved by Board of Trade.
LINKLETER'S IMPROVED "C" TYPE.
May be instantly changed from Seat form into a BUOYANT APPARATUS OF STABILITY.
Sole Makers:—
Linkleter's Patent Ship Fittings Co., Hudson St., North Shields.

BRASS WORK
for Shipbuilders and Engineers.
JOHN McROBIE & SONS, 94, ELLIOTT STREET, GLASGOW.
ON ADMIRALTY LIST. TELEPHONE—CHARING 841.

Every thinking British Merchant Captain or Officer joins as a matter of course
THE IMPERIAL MERCHANT SERVICE GUILD.
It regulates the multitudinous affairs of the profession and has secured for it material benefits of incalculable value.
If a Captain send 30s., if an Officer 17s. 6d., to the Secretary,
Lieut. T. W. MOORE, R.N.R., The Arcade, Liverpool,
(Agencies also in the leading shipping districts), and your professional interests are protected forthwith.

ALPHABETICAL INDEX TO ADVERTISERS.

A

Aberdeen Line... ... ... —
Alison, J. Gordon, & Co., Ltd. —
Allen, W. H., Son & Co., Ltd. —
Anglo-Delta Slab Co., Ltd.... —
Anglo-Mexican Petroleum Co., Ltd. ... ... —
Anglo-Spanish Coaling Co., Ltd. 19
Ardrossan Dry Dock & Shipbuilding Co., Ltd. ... ... —
Aston Brass Co. & Whitehouse, Ltd. ... ... —
Aston Chain & Hook Co., Ltd. —
Atlas Co., Ltd. 37
Atlas Preservative Co., Ltd.... 5

B

Bailey, C. H. 32
Barry Graving Dock & Eng. Co., Ltd. 37
Bayliss, Jones & Bayliss, Ltd. 28
Beckett, Laycock & Watkinson, Ltd. ... ... —
Beldam Packing & Rubber Co., Ltd. ... ... —
Belliss & Morcom, Ltd. ... 12
Beresford Engineering Co. ... —
Berry, Henry, & Co., Ltd. ... —
Bethune, C. ... ... —
Beynon, T., & Co., Ltd. ... —
Billington & Newton, Ltd. ... 1
Birkett, T. M., & Sons, Ltd. —
Bliss, E. W., Co. ... ... —
Bolton, Thos., & Sons, Ltd. —
Boothroyd, H. T., Ltd. ... —
Bowran, Robt., & Co., Ltd.... 1
Braby, Fredk., & Co., Ltd.... —
Briggs, W., & Sons, Ltd. ... 24
Britannia Foundry Company 37
Britannic Merthyr Coal Co., Ltd. 23
British Ljungstrom Marine Turbine Co., Ltd. 16
British Marine Motor and Launch Co., Ltd. 15
British Thomson-Houston Co., Ltd. ... ... —
British Westinghouse Electric & Manufacturing Co., Ltd. —
Broadbent, Thos., & Sons, Ltd. 10
Bromell Patents Co., Ltd. ... 32
Brooke, G. 31
Brown Bros. & Co. 18
Brown, David, & Sons, Ltd. —
Brown, John, & Co., Ltd. ... —
Brown, Robert, & Co., Ltd.... —
Brown, W. B., & Co. (Bankhall), Ltd. 37
Bulls Metal & Melloid Co., Ltd. 26
Brundrit, Joseph ... ... —
Buyers' Guide ... 33, 34, 35 & 36

C

Cairns, Noble & Co., Ltd. ... —
Cambridge Scientific Instrument Co., Ltd. ... ... —
Cambrian Collieries, Ltd. ... 23
Campbells & Hunter, Ltd. ... 6
Central Marine Engine Works —
Chadburns Telegraph Co., Ltd. —
Chalmers, Wm., & Co., Ltd. 20
Chatwin, Thos., Ltd.... ... 8
Clarke, Chapman & Co., Ltd. —
Cockburns, Ltd. 24
Coles, Henry J., Ltd. .. —
Crichton, C. & H., Ltd. ... —
Crichton, J., & Co., Ltd ... 18
Crittall Steel Furniture Co., Ltd. 4
Crompton & Co., Ltd. ... —

D

Darlington Forge Co., Ltd.... —
Davidson & Co., Ltd. ... —
Dawson & Downie, Ltd. ... 37
Day, Summers & Co., Ltd.... 16
Deighton's Patent Tube & Flue Co., Ltd. 22
Delta Metal Co., Ltd. ... 1
Diamond, T., & Co. 32
Dixon, S., & Sons, Ltd. ... 25
Docker Bros., Ltd. 2
Donkin & Co., Ltd. ... ... —
Doxford & Sons, Ltd. ... —

E

Edina Manufacturing Co. ... —
Elder, Dempster & Co., Ltd. 30
Electromoters, Ltd. ... ... —
Ellerman's City & Hall Lines 31
Elliot & Jeffery ... ... —
Else, John, & Son, Ltd. ... —
Excelsior Wire Rope Co., Ltd. —

F

Fair, W. D., & Co., Ltd. ... —
Fellows Bros., Ltd. ... ... —
Ferguson & Timpson ... 20
Fielding & Platt, Ltd. ... —
Frood, Herbert & Co., Ltd.... 26
Fyfe, Wilson & Co. ... ... —

G

Glamorgan Coal Co., Ltd. ... 23
Gledhill-Brook Time Recorders, Ltd. ... ... —
Glen Line, Ltd. 30
Gleniffer Motors, Ltd. ... 14
Goudie, James T., & Co., Ltd. —
Goulds' Foundries Ltd. ... —
Graham, Alfred, & Co. .. 22
Graphite Oils Co., Ltd. ... —
Gray, Wm., & Co., Ltd. ... —
Grayson, H. & C., Ltd. ... 31
Greenwood & Batley, Ltd. ... —
Grieve, Thos., & Sons ... —

H

Halesowen Steel Co., Ltd. ... —
Hall, J. & E., Ltd. 29
Hall, J. P., & Sons, Ltd. ... —
Hamilton, A., & Sons ... 38
Hamilton, Archd. H., & Co. 25
Hamilton, Wm., & Co., Ltd. —
Harfield & Co.... 26
Harland & Wolff, Ltd. ... —
Harris Bros., Ltd. ... ... —
Hawthorn, R. & W., Leslie & Co., Ltd. ... ... —
Heinke, C. E., & Co.... ... —
Herbert, A., Ltd. 7
Hick, Hargreaves & Co., Ltd. —
Higginson, T., & Co.... ... 40
Hill's Dry Docks 31
Hingley, N., & Sons... ... 9
Hingley & Lamb 32
Hogan & Wardrop ... ... -
Hogg-Carr Construction Co., Ltd. ... ... —
Holmes, J. H., & Co. ... —
Holt & Willetts, Ltd. ... —
Holzapfels, Ltd. 29
House, Fredk., & Co. ... —
Howden, J., & Co., Ltd. 13 & 39
Hoyle, Robson & Barnett, Ltd. —
Hudson, John, & Co.'s Successors 37

I

Imperial Merchant Service Guild 37
Isherwood, J. W. 28

J

J. D. Insulating Co. 26
Jenkins, Richards & Evans... 38

K

Kaye, Joseph, & Sons, Ltd. —
Keith Blackman & Co., Ltd., James... ... ... —
Kerman, Chas. J. & Co. ... 37
Kincaid, J. G., & Co., Ltd ... —

L

Laing, Sir James & Sons, Ltd. —
Lamport & Holt, Ltd. ... 30
Lancaster & Tonge, Ltd. ... —
Leeds Forge Co., Ltd. ... 23
Levick, John, Ltd. ... ... —
Linkleter's Patent Ship Fittings Co.... 37
Lister, R. A., & Co., Ltd. ... 40
Liverpool Refrigeration Co. Ltd. 22
Livingstone & Cooper, Ltd. 16
Loveridge, Ltd. 31
Low, Archibald, & Sons, Ltd. —

M

Mactaggart, Scott & Co., Ltd. 4
Martin, W. C., & Co. ... 1
Mather & Platt, Ltd. ... —
Mawdsleys, Ltd. 12
McGeoch, Wm., & Co., Ltd. —
McKechnie Bros., Ltd. ... 1
McRobie, John, & Sons ... 37
Metallic Valve Co. 32
Metograph Co. ... ... —
Midvale Steel Co. of Philadelphia & London, Ltd. ... —
Mirrlees, Watson & Co., Ltd. 27
Mitre Shipping Co., Ltd. ... —
Mordey, Carney & Co., Ltd. —
Mosses & Mitchell ... ... —
Mountstuart Dry Docks, Ltd.

N

Naval Colliery Co. (1897), Ltd. 23
Nelson Line 31
New Zealand Shipping Co., Ltd. 30
Newall, R. S., & Son, Ltd.... 39
Newall's Insulation Co., Ltd. —
Nippon Yusen Kaisha ... 31
Norris, Henty & Gardners, Ltd. 14
North Eastern Marine Engineering Co., Ltd. ... ... —
North Eastern Railway Docks... ... ... —

P

P. & O. Steam Navigation Co. 30
Perman & Co., Ltd. ... ... —
Petters, Ltd. 21
Phœnix Dynamo Manufacturing Co., Ltd. 11
Piggott, Thos., & Co., Ltd.... 29
Powell Duffryn Steam Coal Co., Ltd. ... ... —
Power Plant Co., Ltd. ... 2
Prince Line 30
Prudential Assurance Co., Ltd. ... ... —

R

Ramsay, N. F., & Co. ... —
Ransomes & Rapier, Ltd. ... 27
Rennie & Co. ... ... —
Rhymney Iron Co., Ltd. ... —
Richardsons, Westgarth & Co., Ltd. ... ... —
Richards, Edwin, & Sons, Ltd. 26
Rimer Bros. ... ... —
Ross, R. G., & Son, Ltd. ... —
Rowan, David, & Co. .. —
Royal Mail Steam Packet Co., Ltd. 30
Royal Merchant Seamen's Orphanage ... ... —
Royles, Ltd. ... ... —

S

Scott Bros. (Keighley) .. —
Scott, James, Ltd. ... ... —
Scottish Tube Co., Ltd. ... —
Scriven & Co. 8
Seamless Steel Boat Co., Ltd. 20
Shaw, H. F. ... ... —
Shaw Savill & Albion Co., Ltd. —
Shearman, John, & Co., Ltd. 37
Short Bros., Ltd. ... ... —
Simons, Wm., & Co., Ltd. ... —
Societe Marseillaise de Constructions Mecaniques ... 37
Spencer, John, & Sons, Ltd. —
Spencer & Co., Ltd. ... ... —
Sperry Gyroscope Co., Ltd. —
Standard Piston Ring & Eng. Co., Ltd. 37
Stephen, Alex., & Sons, Ltd. —
Sterne, L., & Co., Ltd. ... 23
Stewart & Lloyds, Ltd. ... 3
Stewart, Arch., & Co. ... —
Stone, J., & Co., Ltd. ... 1
Stothert & Pitt, Ltd. 10
Sunderland Forge & Eng. Co., Ltd. 1
Superheater Corporation, Ltd. 21
Swain, J., & Son, Ltd. ... —
Swan, Hunter & Wigham Richardson, Ltd. ... ... —
Sykes, R., & Sons, Ltd. ... —

T

Taylor, Samuel, & Sons ... —
Thermotank Co. ... ... —
Thompson, Joseph L., & Sons, Ltd. ... ... —
Thornycroft, John I., & Co., Ltd. 1
Trewent, F. J., & Proctor, Ltd. —
Triplex Safety Glass Co., Ltd. 28

U

Union-Castle Line ... ... —
United States Metallic Packing Co. 24
Universal Machinery Corporation, Ltd. 6

V

Valor Company, Ltd. ... —

W

Walco, Ltd. 32
Walford, Leopold (London), Ltd. ... ... —
Walker, James, & Co., Ltd.... 29
Walker, James (Glasgow) ... —
Walls, Ltd. 37
Wallwork, Hy., & Co., Ltd. 25
Wailes Dove Bitumastic Ltd. —
Wallsend Slipway & Eng'g. Co., Ltd. ... ... —
Waring & Gillow 17
Watson, J. S. ... ... —
Websters Ltd. ... ... —
Weir, G. & J., Ltd. ... ... —
White, J. Samuel, & Co., Ltd. 16
Whitfields Bedsteads, Ltd. ... —
Wild, M. B., & Co., Ltd. ... —
Workman, Clark & Co., Ltd. —
Wright, George 21
Wright, Joseph, & Co., Ltd. 3

Y

Yarrow & Co., Ltd.... ... —
Yorkshire Copper Works, Ltd. 1

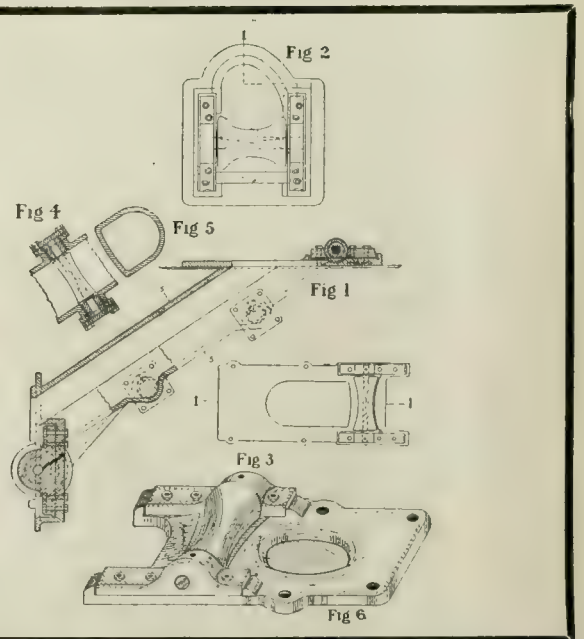
** Where no number is shown against an Advertiser's name, the advertisement appears either in previous or subsequent issues.*
Classified Index to Advertisers will be found on pages 33, 34, 35 and 36.

HAMILTON'S
Patent Hawse-Pipe
and
Patent Hawse-Pipe Deck Flange

(British and Foreign Patents, 1913).

A. HAMILTON & SONS, LTD.,
Iron and Brass Founders, Engineers, &c.,
Victoria Foundry, East Moors, CARDIFF.

Makers of HAMILTON'S PATENT FURNACE BACK BRIDGE
with HAMILTON'S PATENT "V" GROOVED FIREBARS.



JENKINS, RICHARDS & EVANS, LTD.,
Brokers for the Sale, Purchase, Construction and Chartering of Steamers

THE MAINDY SHIPPING CO., LTD.,
STEAMSHIP OWNERS
SHIP AND INSURANCE BROKERS.
CARDIFF
BALTIC HOUSE.
Tele.: "MAINTOP." 'Phone: 1260.

and

THE MAINDY TRADING CO., LTD.,
COAL EXPORTERS AND
BUNKERING CONTRACTORS
LONDON.
23, 24 & 25, BILLITER STREET, E.C.3.
Tel.: "CYMRIC, FEN." 'Phone: Avenue 6083.

Best Quality Galvanized Plough Steel Wire Rope, 10½ in. Circ.

NEWALL'S
Steel Wire Ropes

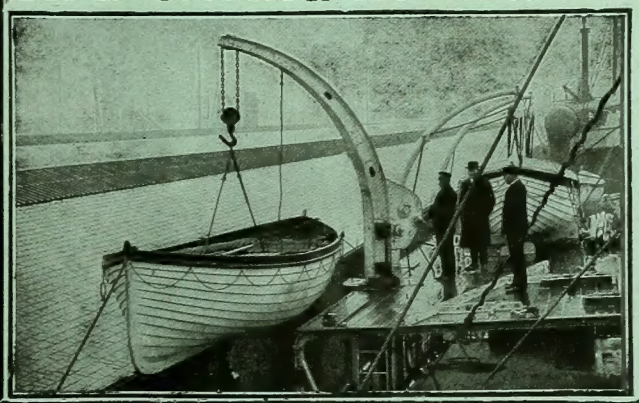
Extra Special Flexible Steel Wire Ropes for use on Giant Cranes, etc., in Shipyards and Engineering Works.

Special Ropes for use on board Warships and for Aeroplanes and Ordnance. :: ::

R.S. NEWALL & SON, LTD.

LIVERPOOL
GLASGOW
LONDON

LIFE-SAVING AT SEA :: BOAT LAUNCHING REFORM.



Maximum of Speed and Safety in Boat Launching attained by fitting

GRAHAM'S PATENT SINGLE DAVIT

In use on Ocean Liners.

Having Mechanical Slewing and Lowering Gear.
Single Suspension. : : : : Central Slinging.
Single Automatic Detaching Hook.

Saving in Weight, Space and Upkeep.

Full particulars from Proprietors:—

JAMES HOWDEN & CO., LTD., SCOTLAND ST., GLASGOW.

SHIPBUILDING AND SHIPPING RECORD

A JOURNAL OF SHIPBUILDING, MARINE ENGINEERING, DOCKS, HARBOURS AND SHIPPING

A link between builder and owner. Drawings and good illustrations a special feature. Practical articles by practical men. The week's shipbuilding and shipping news concisely told. Really useful to all engaged in or in any way connected with shipbuilding and shipping. Essentially the busy man's paper.

PRICE 6d. every THURSDAY.

SPECIAL SUBSCRIPTION FORM.

To THE PUBLISHER,

Please post your paper weekly and send a bill for one year to—

Name _____

Title _____

Address _____

_____

Date _____

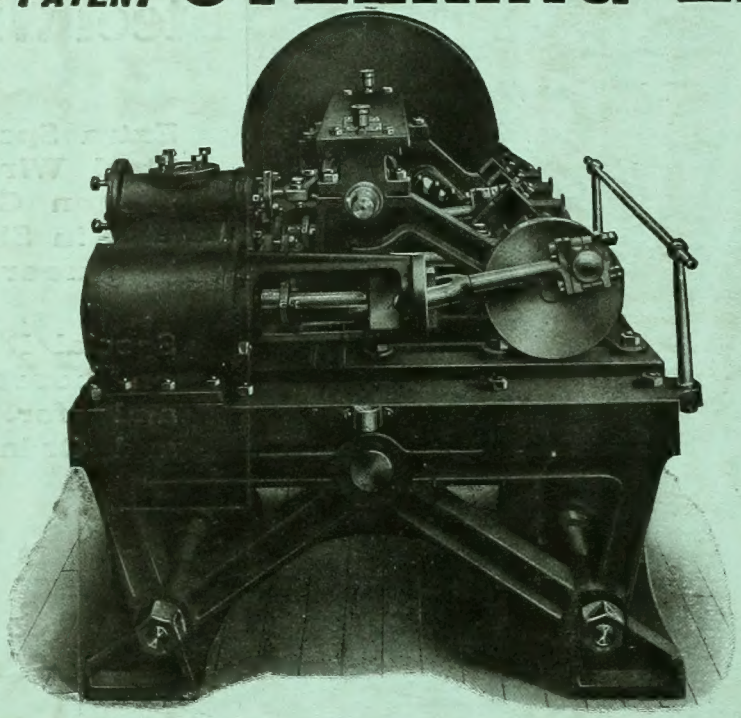
The terms for subscription, per year, are: £1 5s. 0d. in the United Kingdom. £1 12s 0d. abroad.

Editorial and Publishing Offices:—
LONDON—Queen Anne's Chambers, Westminster, S.W. 1.
GLASGOW—87, Union St. NEWCASTLE-ON-TYNE—Lloyds Bank Chambers.

THE

"MOSS" PATENT STEERING ENGINE

THE CYLINDERS ARE FIXED AND THE ORDINARY SLIDE VALVES, ECCENTRICS, AND RODS ARE DISPENSED WITH.



HAVING FEWER WORKING PARTS THE COST OF UPKEEP IS CONSIDERABLY LESS THAN ANY OTHER STEERING GEAR.

Sole Makers: HIGGINSON & CO., Engineers, Hurst Street, Liverpool.

For Emergency Lighting & Wireless.

SELF-STARTING.

The S.O.S. "LISTER-BRUSTON" Automatic Electric Generating Plant is so designed that immediately the voltage of the ship's main electrical supply falls below a predetermined point, the plant automatically starts up.

SELF-TESTING.

This plant automatically starts up and stops at any predetermined time daily, to indicate that it is in working order.

SELF-STOPPING.

Upon the resumption of the main supply the S.O.S. "LISTER-BRUSTON" Automatic Electric Generating Plant automatically stops.

For prices and further particulars apply to—

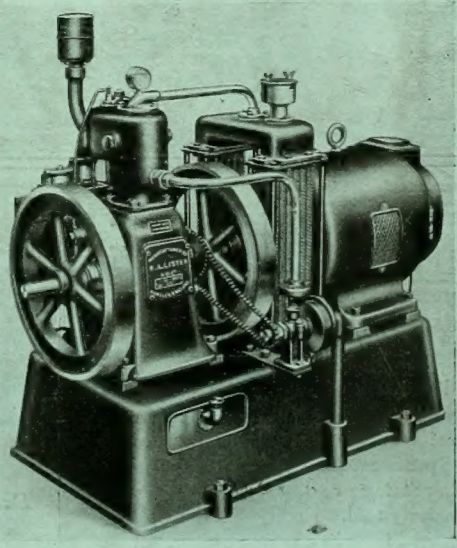
R. A. LISTER & CO., Ltd.

(Dept. B 24),

47, VICTORIA ST., WESTMINSTER, S.W.

DURSLEY, : GLOS. :

Established 1867.



The "Lister-Bruston" (Patent) Automatic Electric Generating Plant, S.O.S. Type.

London: Printed by Harrison & Sons, Printers in Ordinary to His Majesty, 45, 46, and 47, St. Martin's Lane, London, W.C. 2, and published by Transport (1910) Limited, Proprietors of Shipbuilding and Shipping Record, at Queen Anne's Chambers, Westminster, London, S.W. 1. *July* 12, 1917.